

MICR ITEM PROCESSING SYSTEMS

INPUT

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ANALYSIS OF MARKET OPPORTUNITIES
FOR
CONTROL DATA CORPORATION

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MICR ITEM PROCESSING SYSTEMS

SEPTEMBER 1978

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ANALYSIS OF MARKET OPPORTUNITIES FOR CONTROL DATA CORPORATION

MICR ITEM PROCESSING SYSTEMS

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I INTRODUCTION

I INTRODUCTION

- Program authorization to conduct this study was obtained from Control Data Corporation (CDC) Data Systems Division on May 14, 1978.
- The user interview questionnaire was approved at a meeting held at CDC on May 19, 1978.
- The interviews were based on the following definition of bank deposit size:

<u>Size</u>	<u>Deposits</u>
Very Large	More than \$1 Billion
Large	\$500M-\$1 Billion
Medium	\$100M-\$500 Million
Small	Less than \$100 Million

- Interviews were conducted between June 5 and August 31, 1978. The interview program consisted of 56 (user bank operations department executive) interviews, 40 by telephone and 16 on-site; and 12 vendor interviews, 6 by telephone and 6 on-site. The distribution of user interviews by geography and bank deposit size is shown in Exhibit I-1. The states included in each region are shown in Appendix A.

EXHIBIT I-1

BANK OPERATION DEPARTMENT INTERVIEW DISTRIBUTION

BANK DEPOSIT SIZE	NEW ENGLAND		NORTH- EAST		NORTH- CENTRAL		SOUTH- EAST		MID- WEST		MOUNTAIN		PACIFIC- COAST		TOTALS		
	ON SITE	TELE- PHONE	ON SITE	TELE- PHONE	ON SITE	TELE- PHONE	ON SITE	TELE- PHONE	ON SITE	TELE- PHONE	ON SITE	TELE- PHONE	ON SITE	TELE- PHONE	ON SITE	TELE- PHONE	ALL
VERY LARGE >\$1B	1		2	6	2		3	2		2	1		4		13	10	23
LARGE \$500M- \$1B		1		2		2	1		1	3				1	2	9	11
MEDIUM \$100M- \$500M		2				4		6		7			1	2	1	21	22
TOTALS	1	3	2	8	2	6	4	8	1	12	1	0	5	3	16	40	56

- A mid-point review was held at CDC on June 28, 1978.
- Another review meeting was held at CDC on August 11, 1978.
- The telephone interviews averaged about 30 minutes and the on-site interviews 90 minutes.
- The respondents were advised that they would not be identified by name in any published report. For this reason the names of the respondents must be treated carefully.
- Definitions of terms used throughout this report can be found in Appendix B.
- All calculations in this report are based on 1978 prices; that is, no allowance has been made for the effects of inflation. The growth of the number of checking accounts, and in the number of checks written, is real and is based on demographic considerations, consumer preferences to utilize increasing discretionary income, and on the continuing shift to a services oriented United States economy.
- A list of the banks interviewed in the study is in Appendix C.
- A list of the vendors interviewed is in Appendix D.
- User and vendor questionnaires are in Appendix E.

II MANAGEMENT SUMMARY

II MANAGEMENT SUMMARY

A. SCOPE

- This study investigates the market for Magnetic Ink Character Reader (MICR) item processing systems in the United States. The item processing systems may be: (1) highly centralized, primarily high speed MICR reader/sorters attached through controllers to medium to large scale host data processors; (2) satellite, primarily standalone MICR reader/sorters coupled with mini-computers and appropriate peripherals (printers, tapes, disks, etc.); or (3) distributed MICR data entry systems; that is, proof machines that both record entered data in MICR readable form and accomplish normal proof of deposit functions.
- The study considers Optical Character Recognition (OCR) only to the extent that OCR enhances the performance of MICR item processing (reduces first and subsequent pass rejection rates).
- The study primarily covers MICR item processing systems at commercial banks and correspondent bank computer services vendors for demand deposit accounting proof and transit operations. Other applicational uses were investigated and reported upon but were not included in the market analysis and market potential forecasting. These other applicational uses are primarily OCR motivated; they represent less than 10% of the currently installed base.

B. SUMMARY OF RESULTS

I. MARKET STRUCTURE

- Although the number of commercial banks (15,300) is growing slowly (AAGR: 0.5%), the number of branches is rapidly growing (AAGR: 7%) with over 50,000 banking outlets in 1977. This trend coupled with the rapid growth of multi-bank holding companies encourages the distribution of banking operations functions (satellite, standalone, and distributed data entry).
- Very large and large banks dominate the marketplace in terms of deposit share, holding 60% of total bank deposits in 1977 and forecasted to have 69% by 1983.
- The number of checks written annually (which is correlated to bank deposits) is growing from 30 billion in 1977 to 46 billion by 1983, an AAGR of 7½%. This growth continues despite the use of "less check" technology and systems (ACH, EFTS, credit cards, and pay-by-phone).
- Very large down to medium size banks perform virtually all their processing in-house (multi-bank holding companies are in this category) whereas small banks accomplish the major portion (75%) of their data processing using other banks and correspondent bank computer services companies.

2. INFLUENCING FACTORS

- Bank executives are tired of buying larger and larger mainframes. They also feel uneasy about their forced dependency on a centralized host as the nerve center to support bank operations. They are looking to distributed processing systems to "open the mainframe window," to increase system reliability, and to reduce the rapidly rising labor cost spiral. The shift to distributed processing will initially increase satellite and standalone MICR item processing systems market potential, which will in turn be eroded by MICR distributed data entry and proof systems.

- A potentially more economically attractive method of handling checks is called truncation (data capture at the first place of payment presentation). Truncation will occur in stages, initially by supplanting high speed MICR data capture. By 1988 it will become the major (60%) method of demand deposit accounting (DDA) check processing, as the adoption by the very large and large money center banks force, through competition, the medium and small less urban banks to adopt the truncation methodology. Check truncation then will become the factor limiting market potential for MICR reader/sorters.

3. MARKET ANALYSIS

- The 1978 installed base of MICR reader/sorters is between 5,500 and 6,000 units, representing a mature market, with virtually all MICR item processing being automated. Methods of estimating the size of the installed base follow:
 - Considering a one hour "window" and an average aggregate reading speed between 40,000 and 60,000 items per hour, the 1978 installed base of MICR reader/sorters is between 4,500 and 6,700 units. (See Section III-C.2).
 - Extrapolating the installed base of respondents (62) with the total bank population by bank deposit size results in a 1978 installed base of 6,200 units. (See Section III-C.2).
- INPUT has selected 5,500 units as the installed base. Applying a 40 month rental to purchase factor for translating respondent average monthly rental by bank size results in a 1978 installed base purchase value of \$640 million. (See Section III-C.2).
- Operating from an installed base of 5,500 units, the 1978-1983 market potential (shipments) for MICR reader/sorters, (based on a 10% annual replacement, primarily technological, and 7.5% real annual growth), is 6,000 units, or \$660 million. (See Section III-C.3).

- There are approximately 450 other MICR reader/sorters in use (Medical, Utilities, Savings and Loans, Federal Reserve, Federal Home Loan Banks) in other applicational (lock box, reconciliation, payments) areas. The installed base consists primarily of medium to low speed sorters which have the capability of intermixing MICR and OCR documents.

4. COMPETITIVE ENVIRONMENT

- All three user respondents having the CDC 979 Bank Entry Subsystem were very pleased with the system's features, performance, and support. The users wondered why CDC did not more aggressively market the subsystem after its introduction at the 1975 American Bankers Association Conference on Bank Automation.
- Users reported wanting the following improvements in future deliverable subsystems:
 - Ink jet endorsement.
 - Microfilming.
 - Simultaneous MICR data capture and reentry correction.
 - Simultaneous data capture and data transmission.
 - Improved telecommunications processing.
- With regard to CDC Data Systems Division use of Magnetic Peripherals, Inc. (MPI) reader/sorters:
 - The CDC 234-0 has too limited a capability to link with a CDC mini to produce a freestanding proof of deposit (POD) system for small banks having deposits of less than \$100 million.
 - The CDC 234-X, which is currently part of the CDC 979 subsystem, lacks essential features (endorsement and microfilming) to be competitive.

- The CDC 234-Y is competitive in too narrow a market segment (service vendors and multi-bank holding companies), a segment where the user does single packet encoding, his own microfilming, and return item research and inquiry.
- The CDC 234-E is a competitive product for all but the top of the large and the very large banks. However, MPI is already supplying the MICR reader/sorter OEM to competitors (NCR and Cummins-Allison) for standalone item processing systems.
- The study determined that the CDC 979, even with the improved CDC 234-E MICR reader/sorter could not compete in the very large banks because of increased operator and supervisory labor costs.
- Proof and transit operations officers are shifting from medium and low speed MICR reader/sorters to distributed MICR data entry and proofing systems as a more cost effective solution to MICR data capture and error reentry operations. Use of multiple low speed units better balances the work flow and enables proof and transit operations to better meet clearing house deadlines. INPUT believes that shipment of these systems will rise to 30% of the total units shipped by 1983.
- INPUT believes CDC's most significant problem is its low visibility in the banking marketplace. The survey showed that respondents rated (on a scale of 100-0) CDC at 27, whereas NCR was rated at 66, and IBM at 92. Even more significant was that 30 of 57 respondents were not even aware that CDC was in the banking marketplace.
- On an installed unit basis, the 1978 vendor split was:

IBM	31.5%
Burroughs	36.8
NCR	20.6
Others	<u>11.1</u>
	100.0%

The distribution is not representative of IBM's banking sector data processing market share. IBM has captured over 70% of the high speed sorter market-place because of its dominant host data processing market share (less than 70%). However, Burroughs has and will continue to have more units installed as a result of its distributed MICR data entry subsystem.

- On a purchased dollar basis, the 1978 vendor split was:

IBM	43.2%
Burroughs	34.8
NCR	12.1
Others	<u>9.9</u>
	100.0%

Because of its installed base of 3890 sorters, IBM's market shares on a dollar basis exceeds that of Burroughs.

- Total shipments of MICR processing systems for the five year period 1978-1983 is forecasted at 7,800 units distributed as:

- MICR reader/sorters.

•	High speed	(100,000-125,000 items per hour)	559
•	Medium speed	(60,000-90,000 items per hour)	3,154
•	Low speed	(30,000-50,000 items per hour)	1,275

- MICR distributed data entry and proof systems 2,850

- INPUT estimates that with an enhanced CDC 979 product and an adequate (but expensive) marketing program, CDC can capture 6% (180 units) of the medium speed market potential. These 180 units represent an equivalent purchase value of approximately \$20 million, hardly an attractive market opportunity.

- Future market conditions will rapidly decrease the size (replacement and real growth) of the MICR reader/sorter marketplace by 1988. Less check technology (EFTS, ACH, and ATM) and popularized consumer credit transfer systems (pay-by-phone and credit cards) will restrain growth of check volume by 20%. Overlayed will be the utilization of check truncation systems as the dominant method of item processing. INPUT estimates that this emerging technology will reduce remaining MICR item processing equipment shipments in the 1983-1988 time frame by 50%. The remaining 1983-1988 five year market potential of \$300 million is less than half of the value of the 1978-1983 five year total shipments (\$670 million).

C. RECOMMENDATIONS

- INPUT has been asked to recommend to the CDC Data Systems Division whether and how CDC should continue to market the CDC 979 Bank Entry Subsystem to end users. If INPUT were to consider just that option, we would recommend against its continued development based on the following factors:
 - The potential market is small.
 - CDC presently has a very low image in the banking community.
 - Equivalent standalone systems have already been either announced or shipped by NCR and Cummins-Allison, companies that are both experienced with proof and transit operations and well accepted by the banking community.
 - Maintenance costs are high (particularly of satellite MICR data capture systems, and MICR item processing systems placed in less urban areas for small to medium size banks).

- The market potential for freestanding (satellite or single installation) MICR POD systems is being eroded by distributed data entry (Burroughs S 1500, NCR 7750 and successors) and proofing systems.
- The market for MICR reader/sorters has a limited life - six to ten years. The heretofore steady growth of the current market will be reduced by more than 70% beyond 1983.
- INPUT understands that CDC is considering using the computer services route, Service Bureau Corporation (SBC), for market entry into the banking sector. If CDC plans to enter the banking sector in this manner, then INPUT recommends that the CDC 979 should be retained and enhanced.
 - The subsystem could become an on-site node or could be installed at SBC satellite data centers.
 - Interconnected to large scale batch processing CYBER Systems in a distributed national financial services network, the CDC 979 would symbolize CDC's presence in banks (multi-bank holding companies).
 - The CDC Data Systems Division could still market the enhanced CDC 979 to strategic end users (i.e., urban banks and multi-bank holding companies).
- If CDC intends to enter the banking marketplace, CDC Corporate should make a concerted effort to become aligned with a major bank(s) to develop the applicational expertise necessary to market effectively (beta test sites, etc.). This approach will rapidly raise CDC's visibility in the banking industry. INPUT's initial recommendations are:
 - Northwest Bancorp. - 100+ banks
 - Federal Reserve System - 12 banks

- INPUT believes that the CDC 979 is a good product and could fulfill a market need. To forge the subsystem into a profitable venture will require a major corporate commitment that goes well beyond the Data Systems Division role of selling the CDC 979 Bank Entry Subsystem to end users.
- Commercial banks are highly automated and represent a very attractive market area for both EDP equipment and services. The latest ABA National Operations and Automation Conference estimated that banks currently have over \$2.0 billion in installed computer systems. Banks spend over 7% of their total expense on EDP equipment and services. INPUT estimated that banks spent over \$1.3 billion on computer services in 1977. INPUT believes that it could be of significant assistance to CDC in planning successful market entry either via the computer services (SBC) distributed systems route or by a two pronged approach of supplying both computer services and end user (hardware and application software) distributed systems.

III SURVEY RESULTS

III SURVEY RESULTS

A. MARKET STRUCTURE

- The detailed structure of the commercial bank marketplace is contained in INPUT's study titled "Computer Services Markets In Correspondent Banking." A summary of this structure is presented below, extended and amplified as necessary, to reflect the relationship of the market structure to MICR item processing systems.
- The distribution of the number of commercial banks by deposit size from 1960 to 1967 is shown in Exhibit III-1. Although the rate of bank growth in an absolute number sense is low (0.5%), the number of larger banks, which are the greatest users of EDP equipment and services, is growing at the expense of small banks whose deposit size is less than \$10 million. As will be seen later, these small banks are not of great interest to MICR equipment vendors.
- Bank branches are growing rapidly (AAGR: 7%) with over 50,000 banking outlets in 1977. This trend encourages the use of distributed data entry/processing systems.
- The calculated distribution of the number of commercial banks by deposit size from 1977 to 1983 is shown in Exhibit III-2.

EXHIBIT III-1
DISTRIBUTION OF COMMERCIAL BANKS BY SIZE
(1960-1977)

BANK POPULATION / BANK SIZE	1960			1970			1975			1977			AAGR (%)
	NUMBER OF BANKS	PER- CENT (%)	CUM. %	NUMBER OF BANKS	PER- CENT (%)	CUM. %	NUMBER OF BANKS	PER- CENT (%)	CUM. %	NUMBER OF BANKS	PER- CENT (%)	CUM. %	
VERY LARGE >\$1 BILLION	23	0.2%	0.2%	59	0.4%	0.4%	90	0.6%	0.6%	108	0.7%	0.7%	9.5%
LARGE \$500M-1B	30	0.2	0.4	67	0.5	0.9	97	0.6	1.2	113	0.7	1.4	8.1
MEDIUM \$100M-500M	240	1.8	2.2	430	3.2	4.1	698	4.6	5.8	805	5.3	6.7	7.4
SMALL \$10M-100M	2,321	17.4	19.6	5,141	37.9	42.0	8,028	53.4	59.2	9,472	61.9	68.6	8.6
<10M	10,736	80.4	100.0	7,884	58.0	100.0	6,141	40.8	100.0	4,798	31.4	100.0	-
TOTAL	13,350	100.0%	-	13,581	100.0%	-	15,054	100.0%	-	15,296	100.0%	-	0.5%

EXHIBIT III - 2
DISTRIBUTION OF COMMERCIAL BANKS BY SIZE
(1977-1983)

BANK SIZE	1977		1979		1981		1983		AAGR (%)
	(\$B)	(%)	(\$B)	(%)	(\$B)	(%)	(\$B)	(%)	
VERY LARGE >\$1B	108	0.7%	130	0.8%	160	1.0%	190	1.2%	10.0%
LARGE \$500M- \$1B	113	0.7	130	0.8	155	1.0	180	1.1	8.0
MEDIUM \$100M- \$500M	805	5.3	920	5.9	1,050	6.7	1,200	7.6	7.0
SMALL <\$100M	14,270	93.3	14,320	92.5	14,235	91.3	14,200	90.1	-
TOTALS	15,296	100%	15,500	100%	15,600	100%	15,770	100%	0.5%

- The distribution of commercial bank deposits from 1960 to 1977 is shown in Exhibit II-3 and is calculated at the same respective growth rates for the period 1977 to 1983 in Exhibit III-4.
- Very large and large banks dominate (68% for 1977) and will increase their domination (69% in 1983) of the marketplace in terms of deposits. The influence of small banks will increase. This is particularly true for those banks whose deposit size is less than \$10 million. The influence of this type of small bank has been minimized in forecasting MICR sorter deliveries.
- The growing importance of multi-bank holding companies is shown in Exhibit III-5. They are important targets for multiple sales of MICR item processing equipment.
- Total check volume has been increasing at an annual rate of over 7% since 1971. The volumes reported in 1974 by an FDIC study and projected through 1983 are shown in Exhibit III-6. The data also indicates that in the aggregate the volume of checks is directly proportional to bank deposits. This has occurred despite the increase in the use of credit cards, ACH, and EFTS.
- Respondents report an average annual growth in check processing volume somewhat above (8.9%) and item processing volume somewhat below (87 to 124 items per year per \$1,000 in deposits) than reported by the FDIC study. These growth rates are shown in Exhibit III-7 and III-8.
- Very large and large size banks do virtually all their EDP processing in-house. The opposite is true for small banks. Less than 10% of small banks having deposits below \$10 million have in-house EDP equipment (see Exhibit III-9). Small banks as a group utilize outside services vendors (other banks and computer services vendors) the majority (75%) of the time. This is significant when considering marketing MICR item processing systems to small banks.

EXHIBIT III-3
DISTRIBUTION OF COMMERCIAL BANK DEPOSITS
(1960-1977)

BANK POPULATION BANK SIZE	1960			1970			1975			1977			AAGR %
	DEPOSITS (\$BIL)	%	CUM. %	DEPOSITS (\$BIL)	%	CUM. %	DEPOSITS (\$BIL)	%	CUM. %	DEPOSITS (\$BIL)	%	CUM. %	
VERY LARGE >\$1 BILLION	\$ 69.37	29.8%	29.8%	\$223.24	42.2%	42.2%	\$456.51	49.7%	49.7%	\$ 586.84	53.2%	53.2%	13.4%
LARGE \$500M - \$1 BILLION	20.80	8.9	38.7	46.88	8.9	51.1	69.73	7.6	57.3	81.94	7.4	60.6	8.4
MEDIUM \$100M - \$500M	50.90	21.9	60.6	90.03	17.0	68.1	139.04	15.1	76.4	158.98	14.4	75.0	6.9
SMALL \$10M - \$100M	56.39	24.3	84.9	131.35	24.8	92.9	223.17	24.3	96.7	268.08	24.3	99.3	9.6
<\$10M	35.24	15.1	100.0	37.78	7.1	100.0	30.68	3.3	100.0	8.03	0.7	100.0	—
TOTAL	\$232.70	100.0%	—	\$529.28	100.0%	—	\$919.13	100.0%	—	\$1,103.87	100.0%	—	9.6%

EXHIBIT III - 4
DISTRIBUTION OF COMMERCIAL BANK DEPOSITS (\$BILLION)
(1977-1983)

BANK SIZE	1977		1979		1981		1983		AAGR (%)
	(\$B)	(%)	(\$B)	(%)	(\$B)	(%)	(\$B)	(%)	
VERY LARGE >\$1B	\$ 587	54%	\$ 760 . B	57%	\$ 990	59%	\$ 1,290	63%	14 %
LARGE \$500M - \$1B	82	7	95	7	110	7	130	6	8 %
MEDIUM \$100M - 500M	159	14	180	13	210	13	240	12	7 %
SMALL <\$100M	276	25	310	23	350	21	390	19	6 %
TOTALS	\$1,104	100%	\$1,345	100%	\$1,660	100%	\$2,050	100%	11 %

EXHIBIT III-5
DISTRIBUTION OF U.S. MULTI-BANK HOLDING COMPANIES
BY BANK DEPOSIT SIZE
(1976)

ASSET SIZE	NUMBER OF MULTI-BANK HOLDING COMPANIES	NUMBER OF BANKS IN HOLDING COMPANIES	AVERAGE NUMBER OF BANKS PER HOLDING COMPANY	TOTAL MULTI- BANK HOLDING COMPANY ASSETS (\$ BILLION)	AVERAGE ASSETS PER HOLDING COMPANY (\$ BILLION)
VERY LARGE >\$1 B	69	1,135	16	\$310.57	\$4.50
LARGE \$500M - 1 B	44	337	8	33.45	0.78
MEDIUM \$100M - 500M	92	483	5	24.07	0.26
SMALL <\$100M	20	53	3	\$ 1.02	\$0.05

GROWTH OF TOTAL COMMERCIAL BANK CHECK VOLUME 1971-1983

*A SURVEY OF CHECK VOLUMES IN THE U.S.
R.W. POWERS FDIC

EXHIBIT III - 7

AVERAGE GROWTH IN ITEM PROCESSING VOLUME
PER YEAR AS REPORTED BY RESPONDENTS

BANK DEPOSIT SIZE	NUMBER OF RESPONDENTS	AVERAGE VOLUME GROWTH PER YEAR (%)
VERY LARGE > \$1B	19	7.4%
LARGE \$500M -	9	13.8
MEDIUM \$100M -	13	9.7
TOTALS	41	8.9%

EXHIBIT III - 8

ITEM PROCESSING VOLUME AS REPORTED BY RESPONDENTS

BANK DEPOSIT SIZE	NUMBER OF RESPONDENTS	AVERAGE DAILY VOLUME PER \$1M DEPOSITS	PEAK DAILY VOLUME PER \$1M DEPOSITS	AVERAGE YEARLY VOLUME PER \$1K DEPOSITS	PEAK YEARLY VOLUME PER \$1K DEPOSITS
VERY LARGE >\$1B	20	382	498	94.0	122.5
LARGE \$500M- \$1B	10	278	447	68.4	110.0
MEDIUM \$100M- \$500M	18	392	571	96.4	140.5
AVERAGE				87.1	124.3

EXHIBIT III-9

DISTRIBUTION OF EDP UTILIZATION ACCORDING
TO BANK DEPOSIT SIZE
(1976)

EDP USAGE	SMALL		MEDIUM	LARGE	VERY LARGE
	DEPOSITS <\$10M	DEPOSITS \$10-\$100M	DEPOSITS \$100-500M	DEPOSITS \$500M-\$1B	DEPOSITS >\$1B
IN-HOUSE EDP	8.8%	37.1%	79.0%	92.0%	95.0%
OUTSIDE SERVICES	54.6	59.5	20.0	8.0	5.0
NOT AUTOMATED	36.6	3.4	1.0	0	0
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%

B. INFLUENCING FACTORS

I. DISTRIBUTED PROCESSING

- INPUT has just completed an extensive study entitled "Distributed Data Processing Systems: Applications, Performance and Architecture." The study concentrated on four primary market sectors, one of which was banking. The findings concluded that the banking sector was one of the leading sectors turning to distributed processing systems. Executives in large and very large banks were motivated toward distributed processing for three major reasons: (1) labor unrest (strike); (2) terrorism (sabotage); and (3) extended power failure. The executives want to assure that local consumer branch (banks in multi-bank holding companies) operations would continue for extended periods (more than 24 hours) when the central host was down.
- Relentlessly increasing labor costs, coupled with major reductions in computational intelligence costs at the node, offer bank operations executives an opportunity to off-load the mainframe, open the window for batch processing, and return data control to the source where the most human intelligence exists related to data validity.
- The trend toward distributed processing systems initially enhances the market for satellite and standalone MICR item processing systems. The systems off-load the host mainframe and return control to proof and transit experts but move the computational intelligence only partly toward the data entry source. Not only do the Burroughs S 1000 Series and the NCR 7750 systems move distribution to the data source, but they eliminate much of the MICR item processing for data capture and POD. As such they will, over time, seriously erode the lower end of the MICR reader/sorter marketplace. Sixteen of the respondents interviewed were using or were planning to use Burroughs or NCR distributed data entry systems.

2. CHECK TRUNCATION

- Few of the respondents felt that check truncation (stopping check at source of presentation) would become effective in less than five years. A number (32%) of executives (primarily at large and very large banks) felt that some method(s) would be in widespread use in five to eight years and most felt that within ten years image processing would likely supplant MICR item processing as the major method of check processing (see Exhibit III-10).
- Check truncation will occur in stages. The first stage will be capture of the check through both MICR and digital facsimile processing. Here an item number is encoded with the digital image. MICR/OCR is still used to read the MICR data. The checks go to bulk filing and are not sorted until statement preparation time for delivery to the customer. The next step is to substitute country club statements with facsimile images of the checks, eliminating the check sorting. Electronic images will be transmitted within the payments system (Federal Reserve, etc.).
- The BANC R program intends to key encode digital images of checks held at local branches, then send the checks to a regional center for off-line sorting after local proof of deposit has been accomplished. Initially the checks will be sorted and returned to the customer with his statement, but eventually the country club statement with 40 characters of description (like a VISA statement) will be sent without the checks. Electronic images will be transmitted within the payments network.

3. EFTS/ACH

- Time has not borne out the prediction by Arthur D. Little (The Future of the Check - May 1974, Bank Stationers Association) that the impact (moderate) of EFTS/ACH would reduce the 1980 check volume 17% below what it would have otherwise been.

EXHIBIT III - 10

RESPONDENTS' ATTITUDES TOWARD FACTORS
IMPACTING MICR ITEM PROCESSING EQUIPMENT MARKET

FACTOR	NUMBER OF RESPONDENTS		
	NO SIGNIFICANT IMPACT 1978-1983	SIGNIFICANT IMPACT 1978-1983	SIGNIFICANT IMPACT 1984-1988
OCR ENCODING		3	
CHECK VOLUME		3	
DISTRIBUTED PROCESSING		3	
IMAGE PROCESSING/ CHECK TRUNCATION		4	20
NOW ACCOUNTS		3	
EFTS/ACH	13	3	10
FEDERAL PRICING OF SERVICES		3	
PAY BY PHONE		4	2
NONE	7		
NO COMMENT	8		

- Few of the respondents felt that EFTS/ACH operations were or were likely to impact (greater than 5%) MICR item processing volume within the next two to eight years.
- Some bank operations executives felt that consumer data systems such as "pay-by-phone" would become more significant than ACH as a less check method of funds transfer.

C. MARKET ANALYSIS

I. ASSUMPTIONS

- The market analysis presented below assumes that:
 - The market for MICR item processing systems is a mature market; that is, virtually all the processing is automated.
 - The market has a 7.5% real annual check volume growth rate based on demographic and sociological considerations.
 - Technological improvements in performance offset the effects of inflation.
 - There is a 10% equipment replacement factor based primarily on technological innovation.
 - Only one quarter (25%) of small banks with deposits between \$10 and \$100 million have in-house EDP.

- The average 1978 unit purchase price of a MICR reader/sorter, including a controller for off-line fine sort but exclusive of peripherals and minis or other computers, is \$110,000.
- The average conversion factor from rental to purchase price is 40 months.

2. INSTALLED BASE

- Two approaches were used in calculating the current and in forecasting the future installed base.
 - Utilizing annual check volume projections.
 - Using survey data with respect to MICR installed units for banks of different deposit size categories.
- The 1978 annual estimate of checks to be processed is 32.2 billion. Respondents estimate that approximately half of the checks received are local or "on-us," and half are for transit. Executive opinions gathered during on-site interviews indicate that half of the transit checks (25% of total checks) pass through an average of two other transit operations. Thus the annual primary pass check volume is double (64.4 billion), or 268 million (12 months, 21 days per month) checks per day, an impressive number.
- Informed proof and transit executives use a wide variety of considerations in providing for MICR sorter capacity. They must be prepared to process on short notice (30-90 minutes) large volumes (or volumes which represent large dollar value) to make strict clearing house deadlines. First pass capacity appears to be the key parameter in MICR equipment planning.

- Utilizing an average of 50,000 items per hour per MICR sorter and assuming one hour first pass "window" time results in a 1978 installed base of 5,360 sorters. A range of calculations for the installed base using the check volume approach is presented in Exhibit III-11.
- Projecting the average number installed MICR sorters per respondent (Exhibit III-12) over all banks by size categories (Exhibit III-2), Very Large to Medium banks will have 3,273 sorters installed in 1978. The majority (more than 70%) of Small banks use outside data processing services vendors. Assuming 25% have their own in-house systems (probably even less with the growth of multi-bank holding companies), small banks have 2,557 MICR sorters installed. Respondent bank computer services vendor data indicates an average of 3.6 MICR sorters/vendor. Of the over 200 data processing services vendors, approximately one-half are non-bank vendors, adding another 360 units to the 1978 installed base, resulting in a total of 6,190 units.

3. MARKET POTENTIAL

- Using a 1978 installed base of 5,500 units with 7.5% growth and 10% replacement factors, a five year forecast of 6,000 units to be shipped defines the unit market potential (see Exhibit III-13).
- Projecting the respondents average monthly rental per installed MICR equipment over total banks/vendors by size and using a rental to purchase ratio of 40 months, the 1978 dollar value of the MICR equipment base is \$640 million (see Exhibit III-14).
- Alternately, using a 1978 average purchase price of \$110,000, then the dollar value of the installed base is \$605 million and the dollar value of potential shipments is \$660 million over five years (see Exhibit III-15).

EXHIBIT III - 11

INSTALLED BASE FOR MICR SORTERS
BASED ON TOTAL CHECK VOLUME

FIRST PASS EFFECTIVE SPEED (ITEMS PER HOUR)	FIRST PASS WINDOW TIME (HOURS)	INSTALLED BASE 1978 (NUMBER)
40,000	1.5	4,466
	1.0	6,700
	0.5	13,200
50,000	1.5	3,707
	1.0	5,360
	0.5	10,720
60,000	1.5	2,977
	1.0	4,466
	0.5	8,932

EXHIBIT III - 12

INSTALLED BASE FOR MICR SORTERS
BASED ON RESPONDENTS' INSTALLED UNITS
1978

BANK DEPOSIT	NUMBER OF RESPONDENTS	RESPONDENTS AVERAGE INSTALLED MICR SORTERS	NUMBER OF BANKS/VENDORS (1978)	TOTAL NUMBER OF INSTALLED MICR SORTERS
VERY LARGE >\$1B	23	7.7	119	916
LARGE \$500M-\$1B	11	4.5	122	549
MEDIUM \$100M-\$500M	22	2.1	861	1,808
SMALL <\$100M	0	NA	10,282	2,557
SERVICES VENDORS	6	3.6	100	360
TOTAL	62	-	-	6,190

NA - NOT AVAILABLE

EXHIBIT III - 13

UNIT FORECAST OF MICR READER/SORTER MARKET
1978-1983

YEAR	INSTALLED BASE (START OF YEAR UNITS)	REPLACED UNITS	ANNUAL SHIPMENTS		IN- STALLED BASE END OF YEAR (UNITS)
			REPLACE- MENT	GROWTH	
1978	5,500	550	550	420	5,920
1979	5,920	592	592	440	6,360
1980	6,360	636	636	480	6,840
1981	6,840	684	684	510	7,350
1982	7,350	735	735	550	7,900
1983	7,900	790	790	590	8,490
TOTALS			3,437	2,570	

RESPONDENT'S AVERAGE ANNUAL EXPENDITURES FOR MICR PROCESSING EQUIPMENT
BY BANK SIZE

1978

BANK/VENDOR SIZE	NUMBER OF RESPOND- ENTS	AVERAGE MONTHLY RENTAL PER EQUIP- MENT (\$ DOLLARS)	AVERAGE MONTHLY RENTAL INSTALLED UNITS	AVERAGE MONTHLY RENTAL PER BANK (\$K)	AVERAGE MONTHLY RENTAL ALL BANKS/ VENDORS (\$M)	EQUIPMENT BASE INSTALLED (\$M)
VERY LARGE >\$1B	10	\$7150	7.7	\$55.0	\$ 6.5	\$ 26.0
LARGE \$500M-\$1B	9	2800	4.5	12.6	1.5	60.0
MEDIUM \$100M-\$500M	12	2125	2.1	4.5	3.9	156.0
SMALL <\$100M	0	1200	1.0	1.2	3.1	124.0
SERVICES VENDORS	3	2650	3.6	9.5	1.0	40.0
TOTAL					\$16.0	\$640.0

EXHIBIT III - 15

DOLLAR FORECAST OF MICR READER /SORTER MARKET
1978-1983

YEAR	INSTALLED BASE (\$MILLION)	ANNUAL SHIPMENTS (\$MILLION)
1978	605	107
1979	\$ 651	\$ 114
1980	700	123
1981	752	131
1982	809	141
1983	869	152
TOTAL		\$ 661

4. OTHER MARKET AREAS

- Vendor and on-site user interviews revealed that MICR/OCR reader/sorters are used in the applicational areas shown in Exhibit III-16.
- Estimated total 1978 installed base for areas other than MICR check processing is 450.
- Except for the Federal Reserve banks, there is a prime requirement for OCR as well as MICR on the installed equipment. In fact, the reader/sorter must be able to handle intermixed paper of differing thicknesses.
- Most of the installed MICR equipment is low to medium speed. Some banks use the equipment for MICR check processing and then for MICR/OCR credit card processing after the check clearing house deadlines have been met.

D. USER ATTITUDES

I. CDC 979 BANK ENTRY SUBSYSTEM EVALUATION

a. Introduction

- The user evaluation is limited to the three respondents having the CDC 979 system installed. Even though the CDC 979 was introduced at the 1975 ABA Operations and Automation Conference, few of the other operations proof and transit respondents were familiar with the CDC subsystem.
- All three respondents were very pleased with the performance of the CDC 92685 reader/sorter and the CYBERCAPTURE Software.
- Two of the respondents wondered why CDC had not marketed the system more extensively since its announcement in 1975.

EXHIBIT III - 16
OTHER MARKET AREAS FOR MICR/OCR ITEM PROCESSING EQUIPMENT
1978

AREA	APPLICATION	ESTIMATED QUANTITY INSTALLED	TYPE	OCR
SAVINGS AND LOANS	MORTGAGE PAY- MENT	20	LOW SPEED	X
FEDERAL HOME LOAN BANKS	LOCK BOX	20	MEDIUM SPEED	X
COMMERCIAL BANKS	LOCK BOX, CREDIT CARDS	125	LOW TO MEDIUM SPEED	X
PUBLIC UTILITIES	DRAFT RECONCIL- IATION, LOCK BOX	50	LOW SPEED	X
FORTUNE 100 COMPANIES	DRAFT RECONCIL- IATION, LOCK BOX, CREDIT CARDS	100	LOW SPEED	X
MEDICAL THIRD PARTY PAYMENTS (BLUE CROSS)	PAYMENTS, RECON- CILIATION	60	LOW SPEED	X
FEDERAL RESERVE	TRANSIT	75	HIGH SPEED	
TOTAL		450		

- Typical user comments on the CDC 979 subsystem are shown in Exhibit III-17.
- b. MICR Subsystem Hardware
- A summary of the hardware features that respondents felt were effective is presented below:
 - The sorter mechanism is simpler than the IBM 1419 or the Burroughs 9134; there are fewer moving parts.
 - The system cost is about \$2,000 a month less than the IBM System 3 Model 10, the NCR 101 System, or the Burroughs B 344 (obsolete).
 - The reject reentry subsystem works very well.
 - The average first pass reject rate was less than 2%.
 - The ability to do data transmission to a remote host site is provided.
 - The sonic sensors give better document control.
- Hardware features that respondents felt would enhance system utilization are:
 - Fixed plate endorsement.
 - Non-impact item numbering.
 - On-line microfilming during read cycle.
 - Increased number of pockets - average 20.
 - Faster printer - minimum 600 lpm.
 - Multiple printers/system.

EXHIBIT III-17

TYPICAL RESPONDENT COMMENTS ON CDC 979 SUBSYSTEM FEATURES

- "The 300 lpm printer is not fast enough to meet the host check processing "window" time."
- "Their isn't enough core to do reentry and item capture at the same time - an additional 4,000 is needed."
- "The slanted pockets sometimes throw out checks."
- "The key stations could use a larger screen."
- "Even if we shift to an IBM mainframe, we will stay with a free standing MICR item processing system."
- "The reject rate of less than 2% is outstanding."
- "CDC missed the boat by not marketing it sooner."
- "The free standing approach is better than the mainframe route, because reliability is better, system cost is less, and the proof and transit department can operate it themselves."
- "The CYBERCAPTURE Software was the only free standing system that could do a job equivalent to that of the IBM CPSS and the Burroughs IPS."

c. CYBERCAPTURE Software

- The most favored features of the CYBERCAPTURE Software are summarized below:
 - Column printing of items.
 - Application totaling.
 - Cross referencing.
 - Pass to pass reconciliation.
 - Reentry processing.
- The most important required software system enhancements are:
 - More effective telecommunications processing with the ability to interface with CDC and IBM mainframes.
 - Accomplish reject reentry and data capture simultaneously.
 - Data transmission from disk rather than tape.
 - NOW accounts.
 - Ability to do data capture and data transmission simultaneously.

d. System Support

- Two of the respondents felt that the level of CDC service was "excellent." The third felt that the current level of support has improved and is now "good." One respondent rates overall CDC service better than that of any other vendor.

2. INSTALLED MICR EQUIPMMENT

- MICR equipment characteristics and deployment are shown in Exhibits III-18 and III-19. The successful use of front-end microfilming by very large banks is setting the trend for its use by other banks. On-line reentry error correction and distributed MICR data/proof entry is just showing up in the installed base. It is surprising that only about 60% of the respondents interviewed use the MICR item processing system to accomplish full proof of deposit. This indicates that some leeway exists for equipment and software upgrading.

3. MICR VENDOR SUPPORT

- Users were most favorably impressed with IBM, CDC, and REI for the overall quality of support (Exhibit III-20). Alternatively, some (7%) of the respondents were dissatisfied with the support provided by Burroughs, NCR, and Honeywell. Typical respondent comments on MICR vendor support are in Exhibit III-21. User suggestions on ways vendors can improve MICR service and maintenance are shown in Exhibit III-22.

4. PLANS AND PROGRAMS 1979-1983

- Respondents were by and large very satisfied with their current methods of handling MICR processing (Exhibit III-23). Over 65% (high and good) of all respondents felt this way.
- The major portion (55%) of all respondents were undecided on what changes, if any, they would make in their MICR processing methods during the forecast period (Exhibit III-24). Those that had reached a planning decision indicated an important preference (60%) for installing distributed MICR data entry and proof systems.
- Over 70% of the respondents planned to order more MICR item processing systems during the forecast period (Exhibit III-25). A surprising proportion

CHARACTERISTICS OF RESPONDENTS' MICR PROCESSING EQUIPMENT

BANK /VENDOR SIZE	SAMPLE SIZE	OPTIONS		ENDORSEMENTS		AVERAGE NUMBER OF POCKETS	SPECIAL FEATURES	
		OCR	MICROFILM	IMPACT	INK JET		REENTRY ERROR CORRECTION	DISTRIBUTED MICR DATA ENTRY
VERY LARGE >\$1B	23	4	9	14	6	22	8	5
LARGE \$500M-\$1B	11	0	1	3	3	14	1	5
MEDIUM \$100M-\$500M	22	1	1	4	1	14	1	0
SERVICES VENDORS	6	0	0	1	0	12	2	0

EXHIBIT III - 19
MODE RESPONDENTS' USE MICR EQUIPMENT

BANK/VENDOR SIZE	SAMPLE SIZE *	HOST			SATELLITE		REMOTE	
		POD	ON US	TRANSIT	POD	DATA CAPTURE	POD	DATA CAPTURE
VERY LARGE >\$1B	23	17	5	3	6	3	1	1
LARGE \$500M-\$1B	11	6	3	3	1	1	0	0
MEDIUM \$100M-\$500M	22	13	7	4	0	0	0	0
SERVICES VENDOR	6	2	4	2	0	2	0	0

* MULTIPLE MODES POSSIBLE

EXHIBIT III - 20
RESPONDENTS' SATISFACTION
WITH LEVEL OF VENDOR SERVICE AND SUPPORT

VENDOR	PROPORTION OF RESPONDENTS (%)			
	EXCELLENT	GOOD	ACCEPTABLE	UNACCEPTABLE
IBM (22 RESPONDENTS)	40.9%	40.9%	18.2%	0%
BURROUGHS (21 RESPONDENTS)	19.0%	28.6%	42.9%	9.5%
NCR (10 RESPONDENTS)	30.0%	30.0%	30.0%	10.0%
HONEYWELL (4 RESPONDENTS)	0%	50.0%	25.0%	25.0%
CONTROL DATA (3 RESPONDENTS)	67.0%	33.0%	0%	0%
RECOGNITION EQUIPMENT INC. (2 RESPONDENTS)	50.0%	50.0%	0%	0%

EXHIBIT III-21

RESPONDENTS' COMMENTS ON MICR VENDOR SERVICE

- "Burroughs is giving us a lot of help with the B 1500s. It's a pleasant surprise. They really want to make the product go."
- "We don't get the same degree of support from Burroughs as other users get from IBM. IBM comes in with a complete installation and operations plan and guides the end user through it."
- "IBM gives us excellent service and maintenance."
- "Burroughs needs to be more responsive in fixing software bugs."
- "REI supports us in an excellent manner. They provide on-site personnel 24 hours per day."
- "We are the fourth largest NCR user in the banking sector. We have excellent field support."
- "Burroughs has put all their development into the S 1500 series proof machine. The B 9137 averages 25 items per 100,000 jams, missorts, and feed checks. If the B 9138 in field test at Memphis doesn't show a marked improvement, Burroughs will lose its remaining large bank customers."
- "We need to continually push Burroughs to perform."
- "There are only three customer engineers trained for the IBM/1419 in our area. Sometimes the customer engineer spends hours reading the manual."
- "The NCR guy practically lives here. I'm getting great service."

EXHIBIT III-22

RESPONDENTS' COMMENTS ON WAYS VENDORS CAN IMPROVE MICR SYSTEMS SERVICE AND MAINTENANCE

- "We like the diagnostic capability built into the IBM 3890. They would do a better job of preventative maintenance if their field service people were better trained in software diagnostics."
- "Burroughs needs to find a solution to the undetected MICR missort problem and insure its incorporation in the B 9138."
- "The vendor needs to carry more spare parts in local inventory."
- "We hope the Burroughs B 9138 is all they say it is. We intend to evaluate one here for 60 days."
- "Better trained field engineers and more spare parts in on-site inventory."
- "Better coordination between the home office and service units in field. There are too many surprises!"
- "Better training for customer engineers. They need to be better qualified. Greater availability in our area in order to lower response time on service calls."

EXHIBIT III - 23

RESPONDENTS' LEVEL OF SATISFACTION WITH CURRENT METHOD OF MICR PROCESSING

BANK/VENDOR SIZE	SAMPLE SIZE	PROPORTION OF RESPONDENTS (%)			
		HIGH	GOOD	SATISFACTORY	PROBLEMS
VERY LARGE >\$1B	22	54	14	14	18
LARGE \$500M-\$1B	11	36	46	9	9
MEDIUM \$100M-\$500M	22	32	36	27	5
SERVICES VENDORS	6	68	16	16	0

RESPONDENTS' PLANS FOR MICR CHANGES DURING 1978-1983 TIME FRAME

BANK / VENDOR SIZE	SAMPLE SIZE	PROPORTION (%)			
		SHIFT TO CENTRALIZED	INSTALL SATELLITES	INSTALL DISTRIBUTED DATA ENTRY	NO CHANGE/ UNDECIDED
VERY LARGE >\$1B	23	9	17	35	39
LARGE \$500M-\$1B	11	0	9	9	82
MEDIUM \$100M-\$500M	22	4	9	23	64
SERVICE VENDORS	6	0	0	67	33

EXHIBIT III - 25

RESPONDENTS' PLANS TO ADD MICR ITEM PROCESSING
EQUIPMENT FOR THE PERIOD 1978-1983

PLANS	SAMPLE SIZE	PROPORTION (%)
<ul style="list-style-type: none"> ● TO ORDER - YES - NO - HAVEN'T DECIDED 	62	<ul style="list-style-type: none"> 73 24 3
<ul style="list-style-type: none"> ● PURPOSE - FOR GROWTH - FOR REPLACEMENT - BOTH 	45	<ul style="list-style-type: none"> 38 38 24
<ul style="list-style-type: none"> ● FEATURES/OPTIONS - OCR - MICROFILM - INK JET ENDORSE- MENT - HAVEN'T DECIDED 	45	<ul style="list-style-type: none"> 22 16 51 31
<ul style="list-style-type: none"> ● TYPE - READER/SORTER - DISTRIBUTED MICR DATA ENTRY - HAVEN'T DECIDED 	45	<ul style="list-style-type: none"> 38 31 31

(25%) intended to order OCR as an option and fewer than expected, microfilm. This is probably because the respondents already microfilm their checks on separate equipment or use an outside service. Again, a significant proportion (31%) intended to order distributed MICR data entry/proof systems.

5. MICR EQUIPMENT SELECTION

- The executives responsible for MICR item processing system selection vary according to bank size (Exhibit III-26). At very large banks responsibility for MICR check processing rests with the Central Proof and Transit Officer. At very large banks, the responsibility frequently rests with the Senior Vice President of Operations, whereas at the smaller large banks, the decision maker is the Vice President/Director of Data Processing. This duality also prevails with respect to medium size banks. For small banks (not surveyed in this study), the responsibility evidently would rest with the Vice President/Director of Data Processing. In multi-bank holding companies, the responsibility usually rests with the Vice President of the data services company.
- Bank executives are a conservative lot. They place great importance on continuity, service, and dependability. They have a wide variety of reasons for choosing MICR processor vendors (Exhibit III-27). Some six to eight years ago many selected the Burroughs 2700/4700 mainframes, the Burroughs 9134 sorter, and the Burroughs IPS software as vastly superior to that of the IBM 1419 with System 360/30s. They selected NCR sorters to run with MICR mainframes which were supported by comprehensive NCR banking applicational software packages. Many of them developed their own MICR item processing software. Only about half (52%) recall considering other vendors' hardware and even fewer (20%) considered the software (because many developed it in-house). It will take a lot of hard selling for a new vendor (such as CDC) to convince them (unless they are dissatisfied) to shift vendors. The situation is not quite the same for multi-bank holding companies where the responsible executive is a professional manager attuned to looking at potentially more cost effective solutions.

EXHIBIT III - 26
RESPONDENT EXECUTIVES RESPONSIBLE FOR MICR ITEM DATA PROCESSING OPERATIONS

BANK / VENDOR SIZE	SENIOR VICE PRESIDENT OPERATIONS	VICE PRESIDENT/ CENTRAL PROOF AND TRANSIT	VICE PRESIDENT/ DIRECTOR D.P. SERVICE CO.	VICE PRESIDENT/ DIRECTOR DATA PROCESSING	VICE PRESIDENT/ BANKING SYSTEMS	VICE PRESIDENT/ DIRECTOR D.P. OPERATIONS
VERY LARGE						
>\$2B	2	8		2		
>\$1B	2			1		
LARGE						
\$500M-\$1B	3	1		3		1
MEDIUM						
\$200M-\$500M	6	1		2		2
\$100M-\$200M	1			8		1
MULTI-BANK HOLDING COMPANIES	2	1	8			1
SERVICE VENDORS				1	2	3

EXHIBIT III - 27

RESPONDENTS' REASONS FOR CHOOSING MICR PROCESSING SYSTEMS

REASONS	NUMBER OF RESPONDENTS
● HARDWARE	
- STANDALONE SYSTEM	5
- IBM RELIABILITY AND MAINTAINABILITY	11
- PRICE/PERFORMANCE	12
- HIGHLY CENTRALIZED OPERATION	5
- BURROUGHS B2740/4700 MAIN FRAME PERFORMANCE	7
- FRONT END MICROFILMING	4
- COMPATIBILITY WITH HOST	14
- HAVE ALWAYS BEEN WITH CURRENT VENDOR	9
- DON'T KNOW	6
● SOFTWARE	
- LIKED IBM CPCS	4
- BURROUGHS IPS ONLY GOOD SOFTWARE AVAILABLE AT THE TIME	18
- DEVELOPED OWN SOFTWARE	18
- PURCHASED BETTER PRODUCT FROM SOFTWARE VENDOR	3
- COMPATIBILITY WITH HOST	16
- DON'T KNOW	10

OTHER VENDORS CONSIDERED	YES	NO	DON'T RECALL
● HARDWARE	33	14	12
● SOFTWARE	12	37	10

6. MICR HARDWARE AND SOFTWARE FUNCTIONAL REQUIREMENTS

- Respondents were asked to define the minimum or basic functions the MICR item hardware would have to perform in order for the equipment to be considered. The results are presented in Exhibit III-28, as well as pertinent user comments in Exhibit III-29. The high (45%) proportion of respondents in medium size banks requiring microfilming is an indication that front-end recording is a current requirement. The same can be said for off-line fine sort where the user has flexibility in choosing his sort patterns.
- Primary functions accomplished by respondents' current MICR processing software are in Exhibit III-30. Requirements to fulfill additional functions for the forecast period are in Exhibit III-31. Respondents generally felt that the vendors were able to provide whatever software functions were needed to support their MICR equipment. The majority (74%) of the respondents either had none or did not know their future additional software requirements. Pertinent comments by those respondents who have considered their future software needs are shown in Exhibit III-32.

7. CHANGING CONDITIONS

- Respondents felt that image processing/check truncation would not have a significant impact on MICR reader/sorter equipment until the 1984-1988 time frame. (See Exhibit III-10).
- Respondents also felt that EFTS/ACH had not yet and would not have a significant impact on MICR check volume during the 1978-1983 time frame, but would likely have significant impact within the 1984-1988 planning horizon.
- Typical respondent comments on factors impacting future MICR item processing systems requirements are shown in Exhibit III-33.

EXHIBIT III - 28

BASIC MICR ITEM PROCESSING FUNCTIONS NECESSARY
TO QUALIFY VENDORS FOR CONSIDERATION BY RESPONDENTS

FUNCTION	PROPORTION OF RESPONDENTS (%)			
	VERY LARGE	LARGE	MEDIUM	SERVICE VENDORS
REJECT RATE (AT READ HEAD)	70	45	68	50
JAM RATE	61	18	50	50
NON IMPACT ENDORSER	43	18	25	50
MICROFILM	70	45	45	50
OFF-LINE FINE SORT	52	18	50	67
DATA COMMUNICATIONS	61	18	25	50
FINE SORT REJECTION RATE	57	0	55	50
FIELD VERIFICATION	52	9	36	50
THROUGHPUT RATE	83	55	64	67
POCKET SIZE	52	9	41	16
REENTRY METHOD	61	18	50	67
OCR	21	0	36	16
MIRROR IMAGING	61	9	45	50

EXHIBIT III-29

RESPONDENTS' COMMENTS ON BASIC MICR FUNCTIONS NECESSARY FOR RESPONDENT CONSIDERATION OF VENDOR'S MICR SYSTEMS

- "We need to be able to do capture and transmit simultaneously to effectively use satellite MICR systems."
- "For distributed processing to work, we need a piece of gear that will do proof of deposit and fine sort."
- "We need data transmission capability of at least 9.6 bps, perhaps even 19.2 bps. We need to be able to transmit/receive between satellites and between satellites and the host."
- "We need off-line fine sort where we can set sort patterns with great flexibility before the run."
- "We want greater modularity and flexibility in MICR item processing systems. We don't want to be tied to one way of doing things over the next five years."
- "We want an extra pocket so that we can intersperse separator documents for different processings."
- "We are looking for equipment that has a readable spray endorser. We want the endorsement sprayed one line after the other as the check passes in transit, so we can trace returned checks better."

EXHIBIT III - 30

PRIMARY FUNCTIONS ACCOMPLISHED BY RESPONDENTS' CURRENT
MICR PROCESSING SOFTWARE

FUNCTION	PROPORTION OF RESPONDENTS (%)			
	BANKS			SERVICES VENDORS
	VERY LARGE	LARGE	MEDIUM	
MULTI-BRANCH	88	67	55	100
MULTI-BANK	83	89	75	100
MICROFILM	46	44	10	33
NOW ACCOUNTS	25	11	25	33
AUTOMATIC RECOVERY	92	78	70	50
CASH LETTERS	96	89	90	100
MIRROR IMAGING	75	67	65	83
ON-LINE REJECT REENTRY	34	89	55	83
AUDIT TRAIL	100	89	86	100
ON-LINE FINE SORT	96	67	65	50
OFF-LINE FINE SORT	92	78	90	83
FLOAT ANALYSIS	83	78	86	100

EXHIBIT III - 31

ADDITIONAL SOFTWARE REQUIREMENTS FOR THE PERIOD 1979-1983
MENTIONED BY MORE THAN ONE RESPONDENT

FUNCTION	NUMBER OF RESPONDENTS *
REMOTE MICR DATA ENTRY	4
PROOF OF DEPOSIT AT CONSUMER DEPOSIT LEVEL	3
IMAGE STATEMENTS	2
COUNTRY CLUB DESCRIPTIVE STATEMENTS	2
MIRROR IMAGING	3
ON-LINE REJECT REENTRY	3
ON-LINE FINE SORT WITH PATTERN SELECTION	2
ON-LINE BALANCING	2
NONE	36
DON'T KNOW	10

* MAY BE MULTIPLE REQUIREMENTS PER RESPONDENT

EXHIBIT III-32

RESPONDENTS' COMMENTS ON CURRENT AND FUTURE
MICR ITEM PROCESSING SOFTWARE REQUIREMENTS

- "Capture digital image, assign pin number, use pin number to retrieve facsimile image from bulk file at statement time."
- "Use of twin Burroughs 4700s with shared discs under IPS."
- "We need more modular software with better hooks so we can add specialized codes."
- "We need a broader range of proof and transit statistics on cash flow, branch data, and other bank data."
- "Everyone would like to see more comprehensive float analysis programs."
- "We are locked into our current mainframe, so we can't change software."
- "Everything we need in a software package appears to us to be available from Burroughs, IBM, or NCR."

EXHIBIT III-33

RESPONDENTS' COMMENTS ON TOP FACTORS IMPACTING FUTURE REQUIREMENTS FOR MICR PROCESSING EQUIPMENT

- "MICR item processing is very labor intensive. Image processing is the most promising way to substitute capital for labor in this area."
- "The share draft area (NOW accounts) will force us to standardize our item processing costs and look for more cost effective solutions."
- "Image processing for bulk filing is now economic. With optical or bubble memory, it will become the most cost effective method of check handling."
- "Pay-by-phone and other consumer convenience banking services such as bank debit and credit cards will have more effect on check volume in the near term than ACH and EFTS networks."
- "Reduction of high speed data telecommunications costs will make electronic image processing cost effective."
- "Image processing may be feasible, but not within five years. It's more feasible in England and Europe where EFTS is a way of life."
- "We see EFTS/ATM/POS effecting our check volume less than 5% in the next five years."
- "We don't see anything in the next five years that will help reduce our first pass MICR item requirements."

EXHIBIT III-33 (contd)

- "We are looking to distributed processing to reduce labor cost and help in opening the host processing window."
- "The whole industry is geared around the time when check truncation will occur, and what the requirements for interchange will be."

IV COMPETITIVE ENVIRONMENT

IV COMPETITIVE ENVIRONMENT

A. MICR/OCR VENDORS/PRODUCTS

I. ASSESSMENT OF CDC MICR PRODUCT LINE

- INPUT has reviewed the functional specifications of the four CDC MICR sorters outlined in Exhibit IV-1 in the context of the CDC Data Systems Division using the CDC 979 subsystem to fulfill end user market requirements.
- The CDC 234-0 is too limited to effectively couple with a CDC mini to produce a free standing POD system for small banks with assets of less than \$100 million. Banks of this size which are automated require a host processor such as an IBM System/3 Model 10, or Burroughs 2500 with full application software to do the major portion of the bank's data processing. INPUT did not evaluate the possible role of the CDC 234-0 as an OEM device attached to a larger CYBER or other vendor CPU.
- The CDC 234-X, while a successful component of the current CDC 979 subsystem, lacks essential options (endorsement and microfilm) to be competitive. INPUT regarded the CDC 234-X as a prototype unit.

EXHIBIT IV - 1

CDC MICR /OCR READER /SORTERS

CDC SMALL COMPUTER SYSTEMS DESIGNATION	MPI OEM DESIGNATION	POCKETS	SPEED	OPTIONS
234 - 0	92660	6	830 /MIN	
234 - X	92685	3-14	830 /MIN	-OMR
234 - Y	92685	3-14	830 /MIN	- 1200 /MIN - FIXED PLATE ENDORSEMENT - OMR
234 - E	92690	4-40	1200 /MIN	- OCR - IMPACT ENDORSEMENT - NON-IMPACT ITEM NUMBERING - MICROFILM

- The CDC 234-Y, while offering some options (increased speed and impact endorsing) is competitive only in a narrow market segment (computer services vendors and multi-bank holding companies) where the small bank accomplishes single pocket encoding, microfilming, return item research, and inquiry.
- The CDC 234-E has the necessary basic capabilities and options (non-impact endorsement, microfilming and OCR) to be competitive in all but the top of the large banks and very large banks. The difficulty as INPUT sees it is that MPI is already supplying the CDC 92690 OEM to NCR and Cummins-Allison, both of which have competitive standalone MICR item processing systems.

2. COMPETITIVE PRODUCT OFFERINGS

- The competitive position of the CDC 979 Bank Entry System will be compared to competitive products in its performance (medium-low speed) range, to high speed sorters, and to distributed MICR data entry and proof systems.
- Major vendor offerings are shown in Exhibit IV-2. There are three high speed (125,000 documents per hour) systems currently offered. The IBM 3890 and the Burroughs 9138 (in field test) both operate on-line to large scale hosts. The REI TRACE system is standalone with its own shared (two REI reader/sorters per mini controller) mini. The capabilities of the REI TRACE system are truly impressive and, except for the question of the amount of field maintenance required, should over time capture more of the very large bank marketplace. Since two vendors' products require host processors, it is difficult to come to a valid equivalent price comparison.
- INPUT believes that it is the quality and responsiveness of the IBM field service maintenance organization that has enabled IBM to capture the 70% of the very large and large bank marketplace once held by Burroughs. The 9138 is Burroughs' commitment to stay in the centralized game at the high end. Burroughs must solve the "undetected missort" error problem when jams occur. The TRACE system offers an item numbering approach, an effective method of reentry correction processing. Item numbering also facilitates bulk filing.

EXHIBIT IV - 2

COMPETITIVE MICR/OCR PRODUCT OFFERINGS

TYPE	RATED SPEED DOCUMENTS PER HR.	EFFECTIVE SPEED (RESPONDENTS)	POCKETS	OCR	FIRST PASS REJECT RATE (%)	MICROFILM	NON IMPACT ENDORSEMENT	SPECIAL FEATURES	PROCESSOR	EST MONTHLY RENTAL (\$K)
• <u>SORTER/READERS</u>										
- HIGH SPEED IBM 3890	125,000	90,000	6-36		2.0	X	X		370/138+ HOST	12.0
REI TRACE	125,000	110,000	12-24	X	1.1	X	X	ITEM ENCODING REJECT REENTRY	A6 MINI CONTROLLER	12.5
BURROUGHS 9138	125,000	NA	4-36	X	NA	X		DUAL READ HEADS	B4700+ HOST	10.0
- MEDIUM SPEED IBM 1419	90,000	60,000	13		2.2				SIS/3 MOD 10 370/138	3.0
BURROUGHS 9134/9137*	90,000	55,000	4-32	X	2.6	X*	X*		B1700+ HOST	2.5 3.1*
NCR 6780	70,000	60,000	24-34	X	NA	X	X	VIDEO REENTRY IMAGING	I-8250 MINI	3.0
CUMMINS-ALLISON CCPS	80,000	NA	6-34	X	NA	X	X	VIDEO CORRECT	SP16 MINI	2.5-6.0
- LOW SPEED NCR 6751	40,000	40,000	11		3.4				CENTURY HOST	1.5
LINDY ELECTRONICS BDS 960	45,000	40,000	11	X	1.5				HARD WIRED	2.0
BURROUGHS 9136	54,000	35,000	14	X	2.6				B1700+ HOST	2.5
• <u>DISTRIBUTED MICR</u>										
DATA SYSTEMS BURROUGHS S1500	NA	1100/HR	2-20		NONE			CASSETTES DISCS	MINI CONTROLLER	1.1
NCR 7750	NA	1000/HR	2-20		NONE			MAG TAPE CASSETTES	TCU MINI	1.0

The TRACE system can produce check images for consumer statements, enabling eventual check truncation.

- The CDC 979 subsystem, even if improved with the CDC 234-E higher speed sorter, microfilming, etc. cannot effectively compete in very large banks because of labor costs. Studies of check processing costs indicate that the ratio of labor to equipment costs for MICR processing run three to one. If two enhanced CDC 979 systems priced at \$6,000 per month each perform 25% better than an existing high speed MICR system, respondent proof and transit executives say they would still go for the single unit because they would otherwise need two sorter operators plus additional second shift management personnel (additional \$4,000 per month personnel costs) which results in a less cost effective solution.
- Proof and transit operations executives are turning to the Burroughs S 1500 series and the NCR 7750 distributed MICR data entry systems for an overall cost effective solution to MICR data entry, reject-reentry operations. Personnel either at the entry site (branch bank in a multi-bank holding company) or at the satellite or central operations center are, in any event, required to encode the MICR amount. The newer Burroughs and NCR equipment can process at a rate equivalent to the existing one to five pocket encoders. The check flow is balanced throughout the day as opposed to meeting a short time window for clearing house deadlines. In addition, there is no reject-reentry problem.
- Cash letters and proof of deposit accounting is accomplished through software resident in the distributed MICR processor/controller. The initially reported drawback of slow fine-sort speeds is currently solved by retaining a basic sorter (i.e., 60,000 items per hour) for off-line fine sort (\$1,000 per month) until faster sort speeds are available through a combination of improved transport speed and revised fine sort software for the distributed microcomputer.
- Six Burroughs S 1500s are required to handle in eight hours what a 50,000 per hour MICR reader/sorter system handles in one hour to meet clearing house windows. The Burroughs S 1500 approach accomplishes the task without

additional item processing personnel. The services of a sorter operator for fine sort are the only additional personnel requirements. The Burroughs S 1500s replace an equivalent CDC 979 system plus a sorter operator and at best one data correction operator, total cost being well over \$6,000 per month. It is for this reason that INPUT believes that the distributed MICR systems will capture up to 30% of the new shipments by 1983.

- The CDC 979 with the CDC 234-X sorter is not competitive in the medium to small bank marketplace because the current system lacks the essential options of microfilming, ink jet endorsement, and adequate telecommunications data transmission. However, with the CDC 234-E sorter the CDC 979 becomes very competitive with all host attached sorters (i.e., the IBM 1419, the Burroughs 9134/9137, and the NCR 675) and adequately competitive with the two vendors (NCR and Cummins-Allison) offering or about to offer the same MICR/OCR MPI 92690 sorter in a standalone configuration (see Exhibit IV-3).
- The significant problem as INPUT sees it is that both NCR and Cummins-Allison are both more knowledgeable and much better known in the banking industry than CDC. CDC's image in the banking marketplace was rated by respondents as only 27 (on a scale of 100-0) whereas NCR was rated at 67 and IBM at 95. Even more significant was that 30 of 57 respondents were not even aware that CDC was in the banking marketplace (see Exhibit IV-4). The CDC Data Systems Division finds itself in the unenviable position of having MPI, in effect a CDC subsidiary, create the major competition through OEM sales.

B. MARKET SHARE

I. ASSUMPTIONS

- The market share forecasts presented below assume that:
 - The respondent sample is representative of the entire population.

EXHIBIT IV - 3

COMPARISON OF STANDALONE MICR DATA CAPTURE SYSTEMS

VENDOR	RATED SPEED PER HR.	COMMUNI- CATION PROTOCOL	POCKETTS	REJECT REENTRY	OCR	MICRO FILM	TAPE	IMPACT ENDORSE- MENT	NON IMPACT ENDORSE- MENT	PROCES- SOR	MEMORY (K)	DISC (MEGA- BYTES)	PRINTER (LPM)	PURCHASE RANGE (\$K)	LEASE RANGE/ MONTH (\$K)
CDC 949	50,000	HISYNCH CDC	14	X	X	X	X	X	X	1784-1	64-128	4.4 TO 8.9	300 TO 1200	100 TO 225	2.5 TO 6.0
CUMMINS- ALLISON CPCS	50,000 TO 75,000	SDLC BYSYNCH	6-34	X	X	X	X	X	X	GA SPI6	64-128	4.9 TO 132	125 TO 1000	96 TO 240	2.4 TO 6.0
NCR MINI-VIPS	40,000 TO 70,000	HDLC BYSYNCH	24-34	X	X	X	X	X	X	18250	96-128	9 TO 8	600 TO 1000	120 TO 220	3.0 TO 5.5

EXHIBIT IV - 4

RESPONDENTS' RATING OF VENDOR IMAGE IN BANKING MARKET PLACE

VENDOR	NUMBER OF RESPONDENTS NOT ACQUAINTED WITH VENDOR	NUMBER OF RESPONDENTS RATING VENDORS	AVERAGE RESPONDENTS' RATING 0-100
HONEYWELL	22	35	30.1
BURROUGHS	6	51	65.9
NCR	8	49	65.6
CDC	30	27	26.9
IBM	2	55	92.4
UNIVAC	32	25	25.2
OTHER REI	10	47	71.5

- The proportion of vendor market share for small banks is approximately the same as for medium banks exclusive of computer services vendors.
- The average 1978 unit purchase price for MICR sorters related to throughput (speed) is:

. High	(100,000-125,000 items per hour)	\$250,000
. Medium	(60,000-90,000 items per hour)	\$110,000
. Slow	(30,000-50,000 items per hour)	\$ 60,000
- The NCR 7750 and Burroughs S 1000 Series distributed MICR document processing systems replace MICR sorters at a rate of:

. 6:1 for high speed sorters
. 3:1 for medium speed sorters
. 2:1 for low speed sorters
- The average unit price for a MICR distributed data entry and proof system is \$35,000.
- Check truncation will be implemented on a pilot basis only during the forecast period.

2. INSTALLED BASE

- The installed base of the 62 respondents by bank size is presented in Exhibit IV-5. Assuming that the sample is representative for the entire population, the proportion of the MICR item processing system market share of the installed base was calculated (Exhibit IV-6). The exhibit clearly shows IBM's domination in very large banks and the importance of Burroughs and NCR to medium and small banks.
- Utilizing the respondent installed MICR equipment data (Exhibit IV-5) and the forecast of installed units for all banks (Exhibit III-12), the vendor market

EXHIBIT IV - 5

RESPONDENTS' CURRENTLY INSTALLED MICR ITEM PROCESSING SYSTEMS

1978

BANK /VENDOR SIZE	NO . OF RESPON- DENTS	EQUIPMENT TYPE NUMBER OF UNITS											TOTAL
		IBM		BURROUGHS				NCR				OTHERS	
		1419	3890	9131	9134	9137	670	671	675	7750	REI , HON CDC , LUNDY		
VERY LARGE > \$1B	23	12	83	0	49	15	0	4	0	2	12	177	
LARGE \$500M - \$1B	11	36	0	0	5	0	0	4	1	3	1	50	
MEDIUM \$100M - \$500M	22	9	1	3	13	2	2	5	5	0	5	45	
SERVICE VENDORS	6	5		6	3						8	22	
SUB-TOTALS		62	84	9	70	17	2	13	6	5	26		
TOTALS		146		96				26				26	294

EXHIBIT IV - 6
VENDOR SHARE OF MICR ITEM PROCESSING SYSTEM
INSTALLED BASE
1978

BANK/VENDOR SIZE	SHARE (%)				TOTAL
	IBM (%)	BURROUGHS (%)	NCR (%)	OTHERS REI, HONEYWELL, CDC, LUNDY (%)	
VERY LARGE > \$1B	53.7	36.2	3.4	6.7	100.0 %
LARGE \$500M-\$1B	72.0	10.0	16.0	2.0	100.0 %
MEDIUM \$100M-\$500M	22.2	40.2	26.5	11.1	100.0 %
SMALL * < \$100M	22.2	40.2	26.5	11.1	100.0 %
SERVICE VENDORS	22.7	40.9	-0-	36.4	100.0 %

*Assumes proportion of Market Share for Small Banks is approximately the same as for Medium Banks.

share by type of MICR unit was developed (Exhibit IV-7). Based on currently installed units, Burroughs (36.8%) leads IBM (31.5%) in market share.

- Applying the average dollar value of purchased units to the distribution of MICR units yields the respective vendor's share of the currently installed base in terms of purchase value (Exhibit IV-8).
- Because of its domination in very large banks with its 3890 MICR processing system, IBM controls 43% of the currently installed base.

3. MARKET POTENTIAL

- The forecast of market potential for all types of MICR units for the period 1979-1983 is shown in Exhibit IV-9. The forecast was developed using the distribution of installed units (Exhibit IV-7), together with unit forecast data (Exhibit III-13). INPUT applied its best judgement in developing proportion (%) of market potential for every type of MICR equipment for the period 1979-1983 based on the following factors:
 - Large and very large banks are growing at the expense of small banks, increasing requirements for high speed sorters.
 - The availability of economic standalone MICR sorters able to do complete proof of deposit will encourage bank proof and transit executives to shift MICR item processing away from data processing and to the proof and deposit departments, enhancing the role of cost effective medium speed MICR sorters (CDC, NCR, Cummins-Allison).
 - The desire of bank executives to distribute bank consumer operations will enhance the utilization of MICR distributed data systems (Burroughs S 1000s, NCR 7250s).

VENDOR MARKET SHARE

NUMBER OF UNITS INSTALLED BY TYPE OF MICR UNIT

1978

BANK /VENDOR SIZE	TYPE MICR UNIT (SPEED)	IBM	BURROUGHS	NCR	OTHERS	SUB TOTAL	TOTAL
VERY LARGE >\$1B	HIGH MEDIUM	428 64	332	31	15 46	443 473	916
LARGE \$500M-\$1B	HIGH MEDIUM LOW	55 340	55	44 44	2 9	57 448 44	549
MEDIUM \$100M-\$500M	HIGH MEDIUM LOW	40 362	604 120	480	101 101	40 1067 701	1808
SMALL <\$100M	MEDIUM LOW	579	851 170	675	141 141	1571 986	2557
SERVICE VENDORS	MEDIUM LOW	82	73 74		131	286 74	360
SUB TOTAL	HIGH	523	-0-	-0-	17	540	
	MEDIUM	1427	1915	75	428	3845	
	LOW	-0-	364	1199	242	1805	
TOTAL		1950	2279	1274	687		6190
MARKET SHARE %		31.5	36.8	20.6	11.1		100%

EXHIBIT IV - 8
VENDOR MARKET SHARE
DOLLAR VALUE OF UNITS INSTALLED
1978

BANK/VENDOR SIZE	IBM (\$ MILLION)	BURROUGHS (\$ MILLION)	NCR (\$ MILLION)	OTHERS (\$ MILLION)	TOTAL (\$ MILLION)
VERY LARGE >\$1B	\$114	\$37	\$ 3	\$ 9	\$163
LARGE \$500M-\$1B	51	6	8	2	67
MEDIUM \$100M-\$500M	50	73	29	17	169
SMALL <\$100M	64	104	41	24	233
SERVICE VENDORS	9	12	0	14	35
TOTAL	\$288	\$232	\$81	\$66	\$667
MARKET SHARE (%)	43.2	34.8	12.1	9.9	100%

EXHIBIT IV - 9

FORECAST OF MARKET POTENTIAL FOR TYPES OF MICR UNITS

1979-1983

MICR UNIT TYPES	ANNUAL SHIPMENTS										TOTAL SHIPMENTS
	1979		1980		1981		1982		1983		
	%	UNITS	%	UNITS	%	UNITS	%	UNITS	%	UNITS	
• MICR READER/SORTER											
HIGH SPEED	10%	103	10%	111	10%	119	9%	116	8%	110	559
MEDIUM SPEED	59	608	56	622	53	631	51	658	46	635	3,154
LOW SPEED	26	268	24	266	22	262	20	258	16	221	1,275
TOTAL SORTERS		979		999		1,012		1,032		966	4,988
• MICR DISTRIBUTED DATA SYSTEMS	5	156	10	310	15	521	20	658	30	1,105	2,850
TOTAL	100%		100%		100%		100%		100%		

- The market potential for MICR reader/sorters is 5,000 units and for MICR distributed data systems 3,000 units over the 1979-1983 period.
- The forecast of market shares for the major vendors for the period 1979-1983 is shown in Exhibit IV-10. INPUT applied its best judgement in developing the proportion (%) of vendor penetration based on the following factors:
 - Burroughs will stem the tide of lost business to IBM in the very large and large banks with the successful introduction of the B 9138 high speed MICR item processing system.
 - Burroughs and NCR will replace their own, IBM, and some other vendors' medium and low speed MICR sorters with improved MICR distributed data entry and proof systems.
 - Cummins-Allison at the medium to low speed end, and REI at the high speed end will increase their market share.
 - Lundy Electronics will be acquired by some other vendor (NCR, Burroughs, Cummins-Allison).
 - Other vendors (REI, IBM) will introduce free standing MICR/Mini systems for proof and transit department operations.
- The dollar market forecast of market potential for the period 1979-1984 distributed among competition is shown in Exhibit IV-11. The total value of shipments (\$671 million) compares favorably with that forecast (\$661 million) on a unit basis. (See Exhibit III-15). The CDC forecasted market penetration of under 200 units with a purchase value of just under \$20 million does not appear to INPUT as an attractive market opportunity. The relatively close market share of MICR systems dollars between Burroughs and IBM is peculiar to MICR item processing. Until recently, Burroughs held a dominant position with proof and transit operations executives. With its approach to distributed MICR data processing and its future plans for check truncation, Burroughs

FORECAST FOR MICR VENDOR MARKET SHARE (UNITS)

1979-1983

MICR VENDORS	ANNUAL SHIPMENTS (UNITS)												TOTAL SHIPMENTS
	1979		1980		1981		1982		1983		UNITS		
	%	UNITS	%	UNITS	%	UNITS	%	UNITS	%	UNITS			
• MICR READER /SORTER													
- IBM													
HIGH SPEED	80%	82	75%	80	75%	90	73%	85	73%	80	417		
MEDIUM SPEED	35	212	33	205	32	202	32	211	31	197	1027		
- BURROUGHS													
HIGH SPEED	10	10	15	19	15	17	15	17	15	17	80		
MEDIUM SPEED	48	292	44	274	40	252	36	237	34	216	1271		
LOW SPEED	20	54	20	53	20	52	20	52	20	44	255		
- NCR													
MEDIUM SPEED	5	30	8	50	10	63	12	79	15	95	317		
LOW SPEED	65	174	65	173	64	168	64	165	63	139	819		
- OTHERS													
HIGH SPEED													
- REI	10	11	10	12	10	12	12	14	12	13	62		
MEDIUM SPEED													
- CDC	2	12	4	25	6	38	8	52	8	51	178		
- HON	5	31	5	31	5	32	5	35	5	32	161		
- CUMMINS	5	31	6	37	7	44	7	46	7	44	202		
LOW SPEED													
- LUNDY	5	13	5	13	5	13	5	13	5	11	63		
- CUMMINS	10	27	10	27	11	29	11	28	12	27	138		
• MICR DISTRIBUTED DATA SYSTEMS													
- BURROUGHS	60	94	60	186	53	329	50	329	47	519	1457		
- NCR	40	62	40	124	47	292	50	329	53	586	1393		

EXHIBIT IV - 11
FORECAST OF MICR VENDOR MARKET SHARE (DOLLARS)
1979-1983
ANNUAL SHIPMENTS (\$MILLION)

MICR VENDORS	1979	1980	1981	1982	1983	TOTAL
IBM	\$ 43.8	\$ 42.6	\$ 44.7	\$ 44.4	\$ 41.8	\$ 217.3
BURROUGHS	39.6	44.6	47.1	44.9	46.8	223.0
NCR	15.6	11.7	27.1	30.1	39.3	123.8
REI	8.4	6.0	6.5	7.5	7.5	35.9
CDC	1.3	2.8	4.2	5.7	5.7	19.7
HONEYWELL	2.8	3.4	3.5	3.9	3.5	17.1
CUMMINS-ALLISON	4.4	5.7	6.5	6.8	6.4	29.8
LUNDY	.8	.8	.8	.8	.8	4.0
TOTAL	\$ 116.7	\$ 117.6	\$ 140.4	\$ 144.1	\$ 151.8	\$ 670.6

expects to leap frog over the highly centralized high speed IBM 3890/3895 MICR deposit processing systems.

C. FUTURE MARKET CONDITIONS

- INPUT has made an extrapolation of the market potential for MICR check processing equipment through 1988 (see Exhibit IV-12). In order to highlight the impact of changing market conditions, two forecasts are shown: (1) an extrapolation under the existing market conditions outlined above; and (2) a forecast based on the following factors:
 - Less check technology (EFTS/ACH) and popularized credit transfer systems (pay-by-phone and credit cards) will restrain the growth of check volume 20% by 1988.
 - MICR check truncation will become the dominant method of item processing (60%) by 1988.
 - Consumers will accept country club or similar statements with either check facsimilies or 40 characters of payee descriptive notation as part of their check statements.
- The forecast indicates a reduction in market potential from 12,000 units to 4,000 units, the majority of which will be distributed MICR data entry systems still in use in medium to small banks in less urban areas. The dollar value of all shipments will have dropped from just under \$1 billion to approximately \$300 million, not an attractive long range market for standalone MICR bank item processing subsystems.

EXHIBIT IV - 12
FORECAST OF MARKET POTENTIAL FOR MICR EQUIPMENT
1984-1988

MICR UNIT TYPES	MARKET CONDITIONS UNCHANGED			CHANGING MARKET CONDITIONS		
	%	UNITS	\$M	%LOSS	UNITS	\$M
• MICR READER/SORTER						
HIGH SPEED	8%	807	\$ 202	-80%	126	\$ 32
MEDIUM SPEED	40	4,278	471	-60	1,376	151
LOW SPEED	12	1,766	107	-60	369	34
TOTAL SORTERS	60	6,851	780		1,871	217
• MICR DISTRIBUTED DATA SYSTEMS	40	5,080	178	-50	2,032	71
TOTALS	100%	11,931	\$958		3,903	\$288

V MARKETING AND TECHNICAL REQUIREMENTS

V MARKETING AND TECHNICAL REQUIREMENTS

A. MARKETING REQUIREMENTS

1. INTRODUCTION

- The marketing requirements summary is based on CDC Data Systems Division marketing an enhanced CDC 979 bank entry subsystem to end users primarily in medium to small size banks and to multi-bank holding companies. No consideration is given to marketing the subsystem bundled with correspondent bank processing services (SBC) or as part of a major corporate marketing effort to offer distributed banking systems comprised of CDC CYBER hardware, and bank applicational software.

2. MARKETING REQUIREMENTS

- Of prime importance is an advertising campaign to raise bankers' awareness of CDC as a viable vendor in their marketplace. For example, the current offerings of SBC and CDC Data Systems should be advertised in all pertinent trade journals, etc.
- IBM, Burroughs, and NCR all use favored banks to develop and demonstrate their banking systems. CDC must make long-term arrangements with users to

establish test sites and technical information exchange on how things are done in various bank locations throughout the United States. For example, Kaman Sciences would make an excellent example for services vendors. A California and a Minnesota bank would be geographically better for beta test sites and demonstrations than the Corpus Christi bank.

- Successful proof and transit market penetration by a computer vendor requires a marketing organization having a high degree of technical expertise in all aspects of bank information systems. Marketing personnel must be intimately familiar with the operational requirements of MICR proof and transit.
- Marketing personnel must be able to deal with the proof and transit executive in his terms rather than in data processing oriented systems jargon. (This was a frequently expressed desire by operations executives).
- Marketing personnel must not only be well versed in Federal judiciary and statutory requirements, but also those of the particular state where the bank is located. Therefore, CDC should consider recruiting selected marketing personnel from those regions of the country targeted for marketing entry. This requirement is particularly applicable to the Southeastern United States, (e.g., North and South Carolina) and the Southwest, (e.g., Texas).
- An effective demonstration program is required. The demonstration program is useful for both conventions and for individual demonstrations at the customer's place of business.
- The MICR data entry system should be marketed in a modular fashion, both with respect to function and pricing. The small bank may initially only want the basic configuration, whereas medium size banks will want microfilming and OCR. Modularity in price and growth without equipment replacement are keys to success.
- The marketing organization should be supported by an effective education and training program.

- The proof and transit executive must be offered a total service; that is MICR hardware, software, communications, technical support, and hardware service and maintenance.
- CDC Data Systems Division should pay particular attention to marketing the CDC 979 Bank Data Capture Subsystem to multi-bank holding companies. Such companies frequently operate in more than one state, and in a widely dispersed geographic area. Geographic dispersion lends itself to satellite centers, a good spot for a standalone MICR item processing system with telecommunications capability. This is also true of banks offering correspondent data processing services in extended areas.
- CDC Data Systems Division should also take a good look at computer services vendors offering correspondent data processing services. Larger vendors operate in geographically dispersed areas using satellite MICR item processing centers.

B. TECHNICAL REQUIREMENTS

I. INTRODUCTION

- The technical requirements summary established is for an enhanced standalone CDC 979 bank entry subsystem comprised of:
 - CDC 234-E sorter.
 - CDC CYBER mini.
 - Necessary peripherals such as printers, tapes, disks, and CRTs.
 - Enhanced CYBERCAPTURE software.

- Improved telecommunications capability.
- The summary below presents the salient features of a standalone MICR subsystem competitive primarily in medium size to small bank or in multi-bank holding company sectors of the marketplace. Only the primary hardware and software features are presented. INPUT assumes that CDC is already well aware of competitive MICR reader/sorter features and performance.

2. HARDWARE REQUIREMENTS

- Reader/Sorter.
 - Reader/sorter speed - 60,000 to 80,000 items per hour effective throughput rate.
 - Number of pockets - 14-30.
 - First pass reject rate - no greater than 2%.
 - Optical character recognition - as an option.
 - Microfilming - as an option.
 - Endorsement - plate and ink jet as options.
- Miniprocessor.
 - 16 bit word minimum, 32 bit preferred.
 - Less than one microsecond memory cycle time.
 - 64,000 minimum - expandable to 192,000 memory.
 - Input/output capability to handle:

- Simultaneous data capture, reentry data correction.
 - Simultaneous data capture data transmission.
- Telecommunications hardware that does not require "emulation."
 - 9600 bps minimum.
 - Bysynch.
 - SDLC.
 - Interface with CDC and IBM mainframes.
- Peripherals.
 - Minimum 600 lpm printer.
 - Disk capacity - 9.6 mb with multiple disk capability.
 - Full size CRT data entry screens.

3. SOFTWARE REQUIREMENTS

- Burroughs IPS or equivalent functional capability.
- Operating system that can handle simultaneous data capture and data re-entry, and simultaneous data capture and transmission.
- Telecommunications routine that can handle mini to mini and mini to host data transmission.
- Enhanced float analysis algorithms.
- Data transmission from disk rather than just tape.
- Multi-bank/multi-branch capability.

- On-line reject reentry capability.

- NOW accounts as an option.

4. MAINTENANCE REQUIREMENTS

- On-site or close proximity.

- One hour response time to repair.

- Effectively trained service personnel.

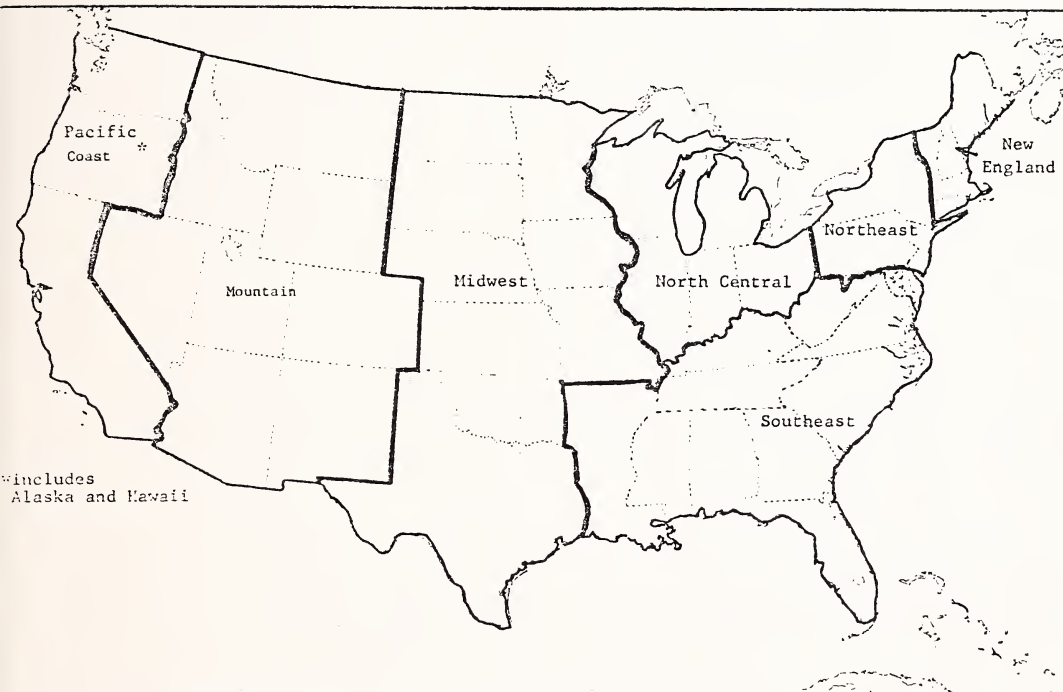
- Adequate on-site and district spare parts inventory.

- No more than one hour preventative maintenance per shift.

APPENDIX A: UNITED STATES
GEOGRAPHIC REGIONS

APPENDIX A

UNITED STATES GEOGRAPHIC REGIONS



REGION	STATES INCLUDED
NEW ENGLAND	MAINE, NEW HAMPSHIRE, VERMONT, MASSACHUSETTS, RHODE ISLAND, CONNECTICUT
NORTHEAST	NEW YORK, NEW JERSEY, PENNSYLVANIA
SOUTHEAST	DELAWARE, DISTRICT OF COLUMBIA, MARYLAND, VIRGINIA, WEST VIRGINIA, KENTUCKY, TENNESSEE, NORTH CAROLINA, SOUTH CAROLINA, GEORGIA, FLORIDA, ALABAMA, MISSISSIPPI, ARKANSAS, LOUISIANA
NORTH CENTRAL	WISCONSIN, MICHIGAN, ILLINOIS, INDIANA, OHIO
MIDWEST	MINNESOTA, NORTH DAKOTA, SOUTH DAKOTA, IOWA, NEBRASKA, KANSAS, MISSOURI, OKLAHOMA, TEXAS
MOUNTAIN	MONTANA, IDAHO, WYOMING, NEVADA, UTAH, COLORADO, ARIZONA, NEW MEXICO
PACIFIC COAST	WASHINGTON, OREGON, CALIFORNIA, ALASKA, HAWAII

APPENDIX B: DEFINITIONS

APPENDIX B: DEFINITIONS

AUTOMATED CLEARING HOUSE(S) (ACH) are established by member banks usually co-located with a Federal Reserve District Bank. The ACH receives transit items such as government and HEW checks in automated form (tape) for deposit in automated form (tape) in the bank of record.

CLEARING HOUSE(S) are established by member banks in a local area (city) or region (then called Regional Check Processing Centers), usually co-located with a Federal Reserve District Bank. Banks send messages to exchange transit checks grouped in the form of cash letters drawn on each other.

DISTRIBUTED MICR DATA SYSTEM is characterized as an intelligent n-Pocket MICR item encoding system which has the capabilities of:

- MICR reading.
- MICR encoding.
- Batch totaling under program control.
- Pocket selection under program control.
- Mini or microprocessor controller.
- Diskette, disk tape cassette or mag tape storage.
- Data telecommunications capability.
- Proof of deposit capability under program control.

- Slow speed sort of MICR encoded documents under program control.
- Endorsing.
- Microfilming.

FINE SORT is the process of sorting checks, normally by account number and normally accomplished with the reader/sorter off-line to the host mainframe. Standalone mini systems have the capability to do fine sort using pre-selected sort patterns.

FLOAT While checks are in transit, i.e., in the process of becoming collected and converted into cash, they are known as "float," and represent contingent rather than actual assets.

FLOAT ANALYSIS is that software subsystem which analyzes selected transactions in an attempt to minimize borderline or illegal transactions which increase customer average balances.

INCOMING CLEARINGS Groups of checks that are presented for payment by other banks that are collecting them for their depositors.

MICR ITEM An individual document such as a check, a draft, a deposit ticket or a cash receipt to be MICR encoded and entered for payment.

ON-US ITEMS Checks which are written by a bank's depositors which debit the depositor's accounts.

PRIMARY CAPTURE/ENTRY A program that accepts batched MICR input, captures all items (including rejects), prints the entry proof list and sorts transactions.

PROOF OF DEPOSIT The mode of MICR system operation where all encoded types of banking transactions are entered into the system in the same sequence that the teller receives them. Credits and debits are intermixed, the computer system proofs the teller, prepares all the cash letters, and sorts the transit checks to their appropriate pocket for end point distribution.

PROOF LIST A list of all accepted and rejected items.

PROOF MACHINE A sophisticated encoder that can select pockets (1 to 5) via operation key command and can do totaling and listing. Proof machines are used to prove teller transactions and MICR encoded documents.

PROVE To balance credits against debits.

REJECTS Conditions on an input document that cause it to fail certain tests, such as unreadable characters, missing data and too much data.

REJECT REENTRY is that process whereby the images of check data which cannot be perfectly read are displayed on a video screen, allowing the data operator to correct the data and reenter the MICR items in the batch as if it had been correctly read.

TRANSIT ITEMS Checks which are presented to one bank from another bank for payment collection.

WINDOW is that time in which the balanced MICR input must be received at the data center so that batch processing can occur in time to return the production in order to conduct the next day's business. Window can also refer to the time when transit check batches must be processed for delivery to the clearing house in the form of cash letters by a prescribed deadline.

APPENDIX C: LIST OF BANK OPERATIONS
DEPARTMENTS INTERVIEWED

LIST OF BANK OPERATIONS DEPARTMENTS INTERVIEWED

ID NO. MIC	NAME	STATE	BANK DEPOSIT SIZE (\$B)	INTERVIEW TYPE	
				PHONE	ON-SITE
36	Puget Sound National Bank	Washington	\$.500	X	
37	Austin National Bank	Texas	.580	X	
38	Sun Bank	Florida	2.000	X	
39	First National Bank of Amarillo	Texas	.390	X	
40	Flagship First National	Florida	.228	X	
41	Pan American Bank NA	Florida	.300	X	
42	Florida National Bank	Florida	1.700	X	
43	American Bank	Texas	.185	X	
44	Capital National Bank	Texas	.347	X	
49	First National Bank/Kansas City	Missouri	.840	X	
50	United Missouri Bank	Missouri	.650	X	
51	First National Bank of Florida	Florida	.157	X	
52	Pacific National Bank	Washington	1.000	X	
53	City National Bank	Texas	.384	X	

APPENDIX C (CONT'D)

LIST OF BANK OPERATIONS DEPARTMENTS INTERVIEWED

ID NO. MIC	NAME	STATE	BANK DEPOSIT SIZE (\$B)	INTERVIEW TYPE	
				PHONE	ON-SITE
54	State National Bank/Connecticut	Connecticut	\$.500	X	
55	Old Colony Cooperative Bank	Rhode Isl.	.570	X	
56	City National Bank of Miami	Florida	.355	X	
57	Leumin Trust Co. of New York	New York	1.200	X	
58	First Huntington	W. Virginia	.132	X	
59	Winters Nat'l. Bank & Trust	Ohio	.700	X	
60	Cape Cod Bank	Massachusetts	.116	X	
61	Kansas City Bank & Trust	Kansas	.175	X	
62	City National Bank	Arkansas	.140	X	
63	The Northwestern Bank	No. Carolina	1.300	X	
64	Citibank	New York	.800	X	
65	Columbia Union National Bank	Missouri	.170	X	
66	Akron National Bank & Trust	Ohio	.515	X	
67	Garden State National	New Jersey	.650	X	

LIST OF BANK OPERATIONS DEPARTMENTS INTERVIEWED

ID NO. MIC	NAME	STATE	BANK DEPOSIT SIZE (\$B)	INTERVIEW TYPE	
				PHONE	ON-SITE
68	San Angelo National Bank	Texas	\$.180	X	
69	Second National Bank	Michigan	.400	X	
70	Texas Commerce Bancshares	Texas	6.500	X	
71	Mid City National	Illinois	.165	X	
72	National City Bank of Evansville	Indiana	.152	X	
73	Commerce Bank of Kansas City	Missouri	.539	X	
74	People's Trust Bank	Indiana	.250	X	
75	Brenco Automation Center	Iowa	.600	X	
76	European American Bank & Trust	New York	2.140	X	
77	First Pennsylvania Bank	Pennsylvania	4.700	X	
78	Girard Bank	Pennsylvania	3.700	X	
79	Bowery Savings Bank	New York	4.600	X	
80	Bank of America	California	66.000		X
81	San Diego Trust & Savings	California	.400		X

APPENDIX C (CONT'D)

LIST OF BANK OPERATIONS DEPARTMENTS INTERVIEWED

ID NO. MIC	NAME	STATE	BANK DEPOSIT SIZE (\$B)	INTERVIEW TYPE	
				PHONE	ON-SITE
82	Bank of California	California	\$ 2.500		X
83	Crocker National	California	9.400		X
84	Wells Fargo	California	12.700		X
85	Corpus Christy	Texas	.600		X
86	Continental Bank	Illinois	16.000		X
87	Harris Trust & Savings	Illinois	4.000		X
88	Chemical Bank	New York	30.000		X
89	Manufacturer's Hanover	New York	30.000		X
90	Bay Banks, Inc.	Massachusetts	2.500		X
91	Barnett Banks of Florida	Florida	2.500		X
94	First National Bank of Arizona	Arizona	1.100		X
95	Florida National Bank	Florida	1.600		X
96	Bank of New Orleans	Louisiana	.500		X
97	Carrier Bank & Trust	Louisiana	2.939		X

APPENDIX D: LIST OF VENDORS INTERVIEWED

APPENDIX D

LIST OF VENDORS INTERVIEWED

ID NO. MIC	VENDOR	VENDOR TYPE			INTERVIEW TYPE	
		SERVICES	HARDWARE	TELEPHONE	ON-SITE	
45	ADP BANKING SERVICES	X		X		
46	METRI DATA	X		X		
47	COLORADO COMPUTER CORPORATION	X		X		
48	BANKING SYSTEMS, INCORPORATED	X		X		
92	SERVICE BUREAU CORPORATION	X			X	
93	KAMAN SCIENCES	X			X	
1	IBM		X	X		
2	NCR		X		X	
3	BURROUGHS CORPORATION		X		X	
4	CUMMINS ALLISON		X		X	
5	REI		X		X	
6	LUNDY ELECTRONICS		X	X		
TOTALS		6	6	6	6	6

APPENDIX E: QUESTIONNAIRES
USERS/SERVICE VENDORS
HARDWARE VENDORS

Vendors (Hardware)

1. What is your most recently announced product for MICR/OCR bank/S & L data capture?

2. What proportion of your total MICR/OCR systems sales (units/dollars) does the S & L Industry represent today?

Units _____%

☐ Don't know

Dollars _____%

3. Do you expect the relative proportion to change over the next 3 - 5 years?

a) 3 years: ☐ <5% ☐ 5-10% ☐ 10-20% ☐ >20% ☐ No Change

b) 5 years: ☐ <5% ☐ 5-10% ☐ 10-20% ☐ >20% ☐ No Change

- 4 a) Are you currently selling MICR/OCT items processing systems to Credit Unions?

Yes ☐

No ☐

b) % of sales: ☐ <2% ☐ 2-5% ☐ >5%

- 5 a) Do you expect that Credit Unions will represent a significant market for the sale of MICR item processing systems over the next 3 - 5 years?

Yes ☐

No ☐

b) 3 years: ☐ <5% ☐ 5-10% ☐ 10-20% ☐ >20%

c) 5 years: ☐ <5% ☐ 5-10% ☐ 10-15% ☐ 15-20% ☐ >20%

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6. To what extent will distributed Data Processing change your product mix of MICR/OCR item processing systems over the next 3-5 years?

a) ☐ None

b) ☐ Shift to data capture, cluster proofing systems

☐ Yes

☐ No

Comments: _____

c) Shift to MICR item truncation at source?

☐ Yes

☐ No

Comments: _____

d) ☐ Other

Comments: _____

7. Do you see any technological changes which will greatly affect the current methods of MICR item processing over the next 3-5 years?

a) ☐ Yes

☐ No

Comments: (Bank America/NCR-image processing project)

Users/Service Vendor

1. What MICR equipment do you currently have installed?

Manufacturer

a) ☐ IBM ☐ BUR ☐ NCR ☐ HON ☐ CDC OTHER _____
Name

Model	Qty.	No. of Pockets	Effective Speed	Year installed	Location (H,S,R)	Cost
						\$ _____ Rental
						\$ _____ Purchase
						\$ _____ Rental
						\$ _____ Purchase
						\$ _____ Rental
						\$ _____ Purchase

H=Host

S=Satellite

R=Remote (i.e. Branch)

b) On-Line to

☐ IBM ☐ SYS 3/ ☐ Sys 360/ _____ ☐ Sys 370/

☐ SYS 3/ ☐ Sys 360/ _____ ☐ Sys 370/

☐ 3890 Processor

☐ BUR ☐ B1700 ☐ B2700 ☐ B3500 ☐ B6 _____ ☐ Other _____

☐ S1000

☐ NCR ☐ 315

☐ Century _____

☐ Century/Criteria _____

☐ Honeywell

☐ S6000

☐ S2000/G100

☐ MICRcom

☐ Series 60 Level _____

- ☐ Univac
- ☐ Series 70
- ☐ Other _____
- ☐ CDC 1784-1
- ☐ _____

2. What options do you have on the MICR equipment itself?

Options:

Cost:

☐ OCR☐ \$ _____ Rental☐ \$ _____ Purchase

Comments: _____

☐ Microfilm☐ \$ _____ Rental☐ \$ _____ Purchase

Comments: _____

☐ Endorsements☐ Plate☐ Ink Jet☐ \$ _____ Rental☐ No. of Lines☐ Front☐ Back☐ \$ _____ Purchase

Comments: _____

☐ Number of Pockets

☐ 1-4 ☐ 5-10 ☐ 10-20 ☐ 20-30 ☐ 30-40 ☐ >40

Comments: _____

☐ Other:

☐ Name _____ ☐ \$ _____ Rental
 _____ ☐ \$ _____ Purchase

☐ Features _____

Comments: _____

3. Are there any special features (other options)?

☐ None

☐ Feature 1.

Name _____

Description _____

Rental \$ _____ Purchase \$ _____

☐ Feature 2.

Name _____

Description _____

Rental \$ _____ Purchase \$ _____

☐ Feature 3.

Name _____

Description _____

Rental \$ _____ Purchase \$ _____

4. What is the applicational use of the MICR equipment itself?

☐ HOST☐ Proof of deposit ☐ Single application "on us"☐ Other _____☐ SATELLITE☐ Proof of deposit ☐ Single application "on us"☐ Data Capture only☐ Other _____☐ REMOTE☐ Proof of deposit ☐ Single application "on us"☐ Data Capture only☐ Other _____

5. What is your item processing volume?

- ☐ Peak ☐ Daily ☐ Other _____
- ☐ Day _____
- ☐ Month _____
- ☐ Other _____

6. At what rate is this volume growing?

Rate _____ % per year

Volume _____

1977	1978	1980
------	------	------

7. What reject rate are you currently experiencing?

- ☐ First Pass _____ %
- ☐ Re-entry _____ %
- ☐ On us _____ %
- ☐ Other _____ %

8. What (if any) programs/plans are you working on to reduce the reject rate?

☐ None

Comments: _____

9. What is your level of satisfaction with respect to vendor service support?

- ☐ Excellent ☐ Good ☐ Acceptable ☐ Unacceptable - Why?

Comments: _____

10. What do you feel can be done to raise the level of maintainability and service responsiveness?

☐ Nothing

Comments: _____

11. Briefly describe the reason you chose your existing MICR Processing Systems (hardware and software) over that of other vendors.

Comments:

a) Hardware (Sorter and Controllers) _____

b) Software (Item Processing) _____

12. Do you recall what other vendors were considered in the hardware/ software selection process?

a) Hardware Vendors Considered ☐ None

b) Software Vendors Considered ☐ None

13. What were the major cost and other factors involved in deciding to process MICR items in the current manner?

☐ Highly centralized ☐ Satellite data capture ☐ Remote data capture

- 14a. What is your level of satisfaction with your current system/method of MICR item processing?

☐ High ☐ Fairly Good ☐ Satisfactory ☐ Problems

Comments: _____

- b). What single item needs revision/improvement?

Comments: _____

15. What changes (if any) do you intend to make in MICR over the next 2 - 5 years?

☐ Install Satellite data capture
☐ Install Remote data capture at branch (bank) sites
☐ Go completely centralized
☐ Other _____

Comments: _____

MICR Hardware

16. What requirements can you identify which are basic for your consideration of a vendors MICR item processing equipment?

- | | |
|---|--|
| <input type="checkbox"/> Reject rate (at read head) | <input type="checkbox"/> Fine Sort reject rate |
| <input type="checkbox"/> JAM rate | <input type="checkbox"/> Field Verification |
| <input type="checkbox"/> Non-impact endorser | <input type="checkbox"/> Throughput rate |
| <input type="checkbox"/> Microfilm | <input type="checkbox"/> Pocket size |
| <input type="checkbox"/> Off line fine sorting | <input type="checkbox"/> Re-entry method |
| <input type="checkbox"/> Data Communications | <input type="checkbox"/> SDLC |
| | <input type="checkbox"/> By SYNCH |
| | <input type="checkbox"/> OCR |
| | <input type="checkbox"/> Mirror imaging |

17. Are there any requirements you currently have or anticipate having which are not being satisfied by currently announced MICR item processing equipment?

☐ yes

☐ no

Comments: _____

- 18a. Do you have on order or plan to order any MICR equipment over the next 2 - 5 years?

☐ yes

☐ no

- b) Manufacturer

- ☐ IBM ☐ Burroughs ☐ NCR ☐ HON ☐ CDC ☐ Other _____
- ☐ haven't decided

18c) Is the equipment

☐ for replacement?☐ for growth?

Model	Qty.	No. of Pockets	Speed	For locations (H,S,R)	For delivery	Cost
						_____ Rental _____ Purchase
						_____ Rental _____ Purchase
						_____ Rental _____ Purchase

H=Host

S=Satellite

R=Remote (i.e. Branch)

Comments: _____

19. What option/special features will you need on the MICR equipment itself?

a) ☐ OCR Cost: Rental \$ _____ Purchase \$ _____

Comments: _____

19b. ☐ Microfilm Cost: Rental \$ _____ Purchase \$ _____

Comments: _____

c) ☐ Endorsements

☐ Plate

☐ Ink Jet

☐ Number of
lines

☐ Front _____

☐ Back _____

Cost: Rental \$ _____ Purchase \$ _____

d) ☐ Number of Pockets

☐ 1-4 ☐ 5-10 ☐ 10-20 ☐ 20-30 ☐ 30-40 ☐ >40

Comments: _____

e) ☐ Other

Name _____

Rental \$ _____

Feature _____

Purchase \$ _____

Comments: _____

20. Are there any special features (other options)?

☐ Feature 1

☐ None

a) Name : _____

Description _____

Rental \$ _____ Purchase \$ _____

20b) ☐ Feature 2

Name: _____

Description: _____

Rental \$ _____ Purchase \$ _____

c) ☐ Feature 3

Name: _____

Description: _____

Rental \$ _____ Purchase \$ _____

21. Please rank each of the following Vendors with respect to their "image" in the banking community.

(Scale is 100 points for top score, 0 for not at all).

Example(0-100) 30 ☐ Honeywell _____(0-100) 70 ☐ Burroughs _____(0-100) 60 ☐ NCR _____(0-100) 20 ☐ CDC _____(0-100) 90 ☐ Univac _____☐ IBM _____

Other _____

22. What item processing software do you currently use?

Vendor _____ ☐ In house

Product name _____

Purchase/Lease Cost ☐ Purchase \$ _____ ☐ Lease \$ _____/month

Date procured/installed _____

Primary Feature:

☐ Multi Branch

☐ Cash letters

☐ Multi Bank

☐ Mirror image (computer
aided data correction)

☐ Microfilm

☐ On-line reject re-entry
capability

☐ Now Accounts

☐ Audit trail

☐ Float analysis

☐ On-line Fine sort

☐ Automatic Recovery
at batch level

☐ Off line fine sort

☐ _____

☐ _____

☐ Comments: _____

23. What new item processing software will you require in the next 2 - 5 years? (Requirements not satisfied by currently announced software.)

☐ Primary Features

a) ☐ _____
Feature

☐ Description _____

b) ☐ _____
Feature

☐ Description _____

c) ☐ _____
Feature

☐ Description _____

d) ☐ _____
Feature

☐ Description _____

Comments: _____

24. What are the most significant factors (top 2 or 3) which will impact your future requirements for MICR processing equipment?

☐ Image processing

Comments: _____

☐ EFTS

Comments: _____

☐ Other

Function _____

Comments: _____

☐ Not Applicable

☐ No Comments

